MID-TOWER MAYHEM
Seven cases brutally reviewed and verdictized! PG. 38

FALCON NORTHWEST TIKI
A Core i7 and GTX 680 in a rig that's just 4-inches wide?! PG. 74

SAMSUNG GALAXY S III
It's a smartphone worthy of a power user! PG. 84

MAXIMUM PC

MINIMUM BS • SEPTEMBER 2012

www.maximumpc.com

DREAM MACHINE 2012

The pinnacle of PC capability—and then some! PG. 22

You won't believe what parts we chose to build this beast!

You'll be amazed at how it performs against the competition!

AS PRETTY INSIDE AS OUT! TURN THE PAGE >>

DISK RECOVERY ROUNDUP

When disaster strikes, which program will save your data? PG. 46

$7.99US
Future MEDIA WITH PASSION
0 72440 38753 9 09>

With **eight cores** of processing might, **four GPUs** tackling graphics, **13TB** of combined **HDD and SSD** storage, and **liquid coolant** running through its veins, you know this year's **Dream Machine** means business!

inside

SEPTEMBER 2012

On the Cover
Photography by
Mark Madeo

FEATURES

22

22
DREAM MACHINE 2012
From the painted case to the killer parts to the water cooling, DM2012 stands proud as the best PC money can buy.

38
THE PERFECT MID-TOWER
We pull seven mid-tower cases into the Lab for an unsparing evaluation of their pros and cons.

46
RECOVER AND RESTORE
Which software will save your bacon if your disk is corrupted or your files are accidentally deleted? Find out.

QUICKSTART

8 **NEWS**
Microsoft wows press but alienates OEMs with Surface tablet; Dropbox discontinues public folder sharing; SSD prices plummet.

14 **THE LIST**
Seven tech trends revealed at Computex 2012.

16 **HEAD TO HEAD**
Skype vs. Google video chat.

Windows 8

R&D

56 **AUTOPSY**
Breaking the Gorilla Glass 2 on a Samsung Galaxy S III will set you back a few bananas.

59 **HOW TO**
Wake your PC with a smartphone or tablet; manage your Google Docs offline with gExplore.

64 **BUILD IT**
We resurrect our 2008 Dream Machine by dropping in some modern-day components—watch this Chromebird fly!

LETTERS

18 DOCTOR

92 COMMENTS

IN THE LAB

78 ORIGIN EON11-S GAMING NOTEBOOK

76 BENQ XL2420T 3D MONITOR

82 AUDIOENGINE A5+ POWERED SPEAKERS

84 SAMSUNG GALAXY S III PHONE

MORE +

MAXIMUM PC

EDITORIAL
Editor-in-Chief: Katherine Stevenson
Deputy Editor: Gordon Mah Ung
Senior Editor: Nathan Edwards
Contributing Editor: Alex Castle
Contributing Writers: Gareth Beavis, Michael Brown, Brad Chacos, Richard Cobbett, Nathan Grayson, Tom Halfhill, Christian Hall, Jeremy Laird, Paul Lilly, Thomas McDonald, Neil Mohr, David Murphy, Quinn Norton
Copy Editor: Catherine Hunter
Podcast Producer: Andy Bauman
Editor Emeritus: Andrew Sanchez

ART
Art Director: Richard Koscher
Contributing Photographer: Mark Madeo

BUSINESS
Vice President, Consumer Media: Kelley Corten, kcorten@futureus.com
Vice President, Sales & Business Development: Nate Hunt, nhunt@futureus.com
Associate National Director of Sales: Isaac Ugay, iugay@futureus.com
Sales Director, East Coast: Thomas Lundell, tlundell@futureus.com
Regional Sales Manager: Christina Grushkin, cgrushkin@futureus.com
Account Executive: Austin Park, apark@futureus.com
Advertising Coordinator: Heidi Hapin, hhapin@futureus.com

Marketing & Sales Development Director: Rhoda Bueno
eCommerce & Fulfillment Director: Lisa Radler
Consumer Marketing Manager: Jong Lee
Newsstand Director: Bill Shewey

PRODUCTION
Production Director: Michael Hollister
Production Manager: Larry Briseno
Production Coordinator: Jose Urrutia
Senior Print Order Coordinator: Jennifer Lim

FUTURE US, INC.
4000 Shoreline Court, Suite 400, South San Francisco, CA 94080
Tel: 650-872-1642, www.futureus.com

Chief Operating Officer: Rachelle Considine
Vice President & Chief Financial Officer: John Sutton
Vice President, Internet & Mobile Products: Mark Kramer
General Counsel: Anne Ortel

SUBSCRIBER CUSTOMER SERVICE
Maximum PC Customer Care,
P.O. Box 5159, Harlan, IA 51593-0659
Website: www.maximumpc.com/customerservice
Tel: 800-274-3421
Email: MAXcustserv@cdsfulfillment.com

BACK ISSUES
Website: www.maximumpc.com/shop
Tel: 800-865-7240

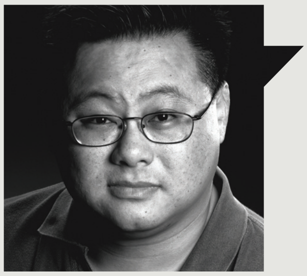
REPRINTS
Future US, Inc., 4000 Shoreline Court, Suite 400,
South San Francisco, CA 94080
Website: www.futureus.com
Tel: 650-872-1642, Fax 650-872-2207

Future produces carefully targeted magazines, websites and events for people with a passion. We publish more than 180 magazines, websites and events and we export or license our publications to 90 countries across the world.

Future plc is a public company quoted on the London Stock Exchange.
www.futureplc.com

Non-executive Chairman: Peter Allen
Chief Executive: Mark Wood
Group Finance Director: Graham Harding
Tel +44 (0)20 7042 4000 (London)
Tel +44 (0)1225 442244 (Bath)

©2012 Future US, Inc. All rights reserved. No part of this magazine may be used or reproduced without the written permission of Future US, Inc. (owner). All information provided is, as far as Future (owner) is aware, based on information correct at the time of press. Readers are advised to contact manufacturers and retailers directly with regard to products/services referred to in this magazine. We welcome reader submissions, but cannot promise that they will be published or returned to you. By submitting materials to us you agree to give Future the royalty-free, perpetual, non-exclusive right to publish and reuse your submission in any form in any and all media and to use your name and other information in connection with the submission.



Gordon Mah Ung

THE FUTURE REALLY IS NOW

THE MISSION of the Dream Machine is always the same: Build the most decadent, over-the-top, overkill PC we can given the best parts and technology available. We don't stray from that mission this year.

Besides the gorgeous case and paint job, the internals are truly off the chart, with its eight-core processor, quad-SLI graphics, 64GB of RAM, 12TB of HDD storage, 1TB of solid-state storage, and a 32GB RAM disk thrown in for kicks. But you know what's even cooler about the Dream Machine? You're getting a glimpse of the future. You see, this virtually unattainable PC will one day become standard issue hardware, and about as exciting as a PS/2 keyboard.

Don't believe me?

The original Dream Machine, which we reminisce about on page 35, was the absolute ultimate PC you could build in its day. Today, a netbook has easily four times the performance and 10 times the storage. The 100,000-transistor question, though, is how long until what you see here trickles down to your computer at a price that won't have you sleeping on the couch.

Perhaps five years? In 2000, we built our first dual-processor Dream Machine using a pair of single-core Pentium IIIs. Today, a dual-core is included on the most commonplace, POS ultra-budget machines and has been no big deal since 2005. Hell, maybe you'll get your octo-core even sooner. In 2005, we built a dual-processor Dream Machine using two dual-core Opteron processors—essentially a quad-core machine. By 2007, quad-core CPUs were well on their way to being ho-hum.

Dream Machine 2005

It's not just CPUs, either. The 2005 Dream Machine used five Hitachi Deskstar 7K500s to build a 2TB RAID 3 array. By 2009, the first 2TB hard drives would appear. So it's not inconceivable that by 2016 we'll see a single drive packing 12TB of storage.

Frankly, we could spend all day looking at the specs of this year's Dream Machine to predict just when each part will become accessible to the average Joe and Jane. So have faith in technology. While this all seems utterly unaffordable, one day you'll be driving your own Dream Machine, wondering what all the fuss was about.

Gordon Mah Ung is Maximum PC's deputy editor, senior hardware expert, and all-around muckraker.

↘ submit your questions to: comments@maximumpc.com

THE NEWS

Microsoft Tries to Flatten Competition with Surface

Company to produce its own tablet while stepping on partners' toes

PC MAKERS have come and gone, but there's one thing that hasn't changed since the beginning: Microsoft makes the software and the OEMs make the hardware. Each stays out of the other's business and everyone is happy.

Unfortunately, that delicate balance was thrown into disarray when Microsoft introduced its Surface tablets in an Apple-like unveiling that had the tech media swooning and PC builders quietly gritting teeth. Although Microsoft has eaten around the edges of its customers' businesses before with game consoles, keyboards, mice, and even networking equipment, the software giant has never directly offered a PC until now. And that's what seems to have put OEMs in a snit.

"It's obvious to me that they don't care at all about us or other OEMs, and I think that could be a problem for them with some customer groups and bigger OEMs alike," said one PC maker, who described OEMs as getting "screwed."

"I expect we will now be forced to go toward entry level to offer an affordable alternative to what we think will be a too-expensive Surface product portfolio," the OEM said. "But it would have saved us many, many R&D dollars had we just been told what to expect from them."

That's apparently the feeling from many other PC OEMs, according to analyst Patrick Moorhead with Moor Insights & Strategy. Moorhead spent some time taking the pulse of OEMs after the unveiling of Surface, and people are pissed. Moorhead said several PC makers who normally work very closely with Microsoft felt blindsided by Surface. Some OEMs had even shown Microsoft their designs, to then watch as Microsoft gave them a big thumbs down by introducing the Surface.

It didn't help that the Surface design seems legitimately well received, with its magnesium body and unique integrated keyboard cover. Although no prices were announced, Microsoft said two versions will be available: The thinner 9.3mm Windows RT version will run on ARM and be price competitive with other ARM tablets. The second one is slightly thicker at 13.5mm, will use an Intel x86 chip, and run Windows 8 Professional. Both will sport 10.6-inch ClearType Full HD Displays.

Moorhead said PC makers have told him they're rethinking their Windows tablet strategies or running back to the arms of Google, which they had previously fled after seeing Android designs go nowhere. Chrome OS, Android, Tizen, Bada, and even WebOS could see new designs now.

Perhaps more dangerous is what happens if Microsoft intends to stay in the PC business.

"Long term, Microsoft cannot compete directly with their OEMs. Microsoft needs to license technology, provide carve-out market opportunities beyond the cheap provider, stop selling PCs, or OEMs will flee Microsoft," Moorhead said. "If too many OEMs start to flee the Microsoft ecosystem, decrease innovation more, or embrace Google strategically, I fully expect Microsoft to start selling notebooks. A Core i5 Surface is a notebook when you dissect it. At that point, Microsoft will have won the battle but lost the war. Apple and Google will have then won." **–Gordon Mah Ung**

Microsoft plans to offer both an ARM version of its sexy Surface running Windows RT and an x86 version running Windows 8.

WD Enters Router Market

This June, Western Digital announced its new line of... routers? Though WD is mostly known for its hard drives, the company has previously expanded into home media streaming and storage with its WD TV Live and My Book Live product families. The My Net routers use software called FasTrack to detect and prioritize streaming video and game traffic to any device on the network to avoid picture or frame-rate degradation. The dual-band Wireless-N routers also include standard advanced features like QoS and port forwarding, as well as guest networks, remote file access, and a streamlined setup process.

WD is shipping several versions of the My Net, including the N600 with dual 300Mb/s bands; the N750, with 300Mb/s and 450Mb/s bands, Gigabit Ethernet, and USB 2.0 ports; the N900, with dual 450Mb/s bands, a dedicated FasTrak coprocessor, *seven* GigE ports, and UPnP and DLNA; and finally the N900 Central, which contains the dedicated processor, four GigE ports, one USB 2.0 port, and 1- or 2TB of internal storage. **–NE**

Dropbox Drops Public Folders

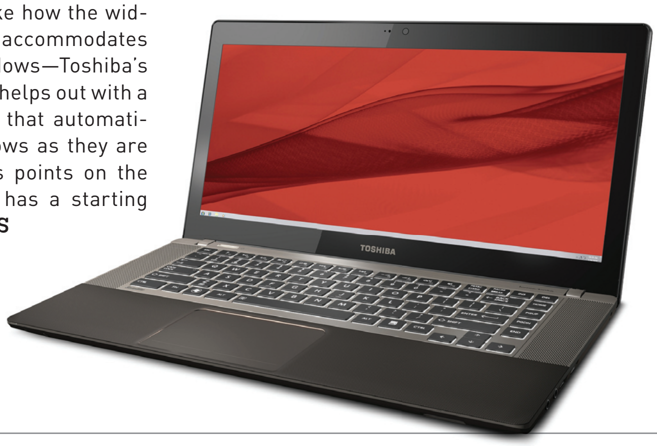
The MegaUpload fallout continues: While the U.S. government's case for Kim Dotcom's extradition is still slowly winding its way through the New Zealand court system, other file-sharing services are scrambling to preemptively batten down the hatches in an attempt to avoid similar sanctions and woes.

Dropbox got in on the CYA action by discontinuing public sharing folders for new Dropbox accounts effective July 31.

Basically, new users will still be able to share files with friends, but they'll need to generate and share a link to the specific file first, something Dropbox users can do currently. According to the announcement, "This new sharing mechanism is a more generalized, scalable way to support many of the same use cases as the Public folder." If you're already a Dropbox user, fear not: Your Public folder is staying safe, sound, and open to all—at least for now. **–BC**

Toshiba Widens Ultrabook Category

We're quickly learning that Ultrabooks can take many shapes and sizes, provided they adhere to Intel's sub-1-inch Z-height requirement. Toshiba's new Satellite U845W not only sets a new precedent in the Ultrabook space, but also presents a new form factor for notebooks in general. The screen is 14.4 inches diagonally, with the unique resolution of 1792x768, making it the first portable device with a 21:9 aspect ratio. According to Toshiba, this distinct panel makes the U845W *the* perfect Ultrabook for movie buffs and productivity hounds alike. The former group will appreciate that they can view 2.35:1 movies in their original format—no horizontal black bars needed. The latter group will like how the wider display better accommodates multiple open windows—Toshiba's Split Screen Utility helps out with a preconfigured grid that automatically resizes windows as they are dragged to various points on the screen. The U845 has a starting price of $1,000. **–KS**



Tom Halfhill
Fast Forward

AMD ADOPTS ARM FOR ARMOR

IN MY FEBRUARY 2007 column, I predicted that PC processors would go beyond integrating CPU cores with graphics: "PC processors may have multiple cores for decoding digital audio and video, running the network-software stack, managing security functions, and performing other specialized tasks. There's no need to dedicate large, complex, general-purpose cores to those narrow jobs. Some cores will be large, some will be small, and some will run at different clock speeds. Some cores may not be x86 compatible."

This concept is called heterogeneous multicore processing, and now AMD is bringing it to PCs. Future AMD processors will integrate an ARM Cortex-A5 core to run some security tasks using ARM's TrustZone technology. Although AMD's Fusion processors already qualify as heterogeneous multicore chips by integrating CPUs with graphics, the addition of a completely different general-purpose CPU is a fuller realization of the concept. Expect more to come.

Why not use the existing x86 cores for all security processing? After all, they're much faster than the Cortex-A5, which is more optimized for small size and low power consumption than high performance. And the Cortex-A5 is incompatible with PC security software, because it's based on a non-x86 RISC architecture. But it's fast enough, and its small footprint will add little cost and power to an x86 desktop or server chip. Also, ARM cores are immune to x86-specific malware.

AMD may supplement the Cortex-A5 with a dedicated cryptography engine like those found in today's networking processors. Such engines are even faster and harder to attack than a general-purpose CPU core. The Cortex-A5 could assist with cryptography, manage a secure boot process, or shadow some critical x86 operations as a safety check.

Whatever AMD has in mind, it's another step toward a future in which virtually all microprocessors will be heterogeneous multicore designs.

Tom Halfhill was formerly a senior editor for *Byte* magazine and is now an analyst for *Microprocessor Report*.

Thomas McDonald
Game Theory

THE CRITICAL CONUNDRUM

THERE ARE two problems with creating a context for discussing Portal and Quantum Conundrum: the problem of genre and the problem of the designer. Portal and QC are usually lumped in with physics puzzlers. This is completely wrong. Cut the Rope and Incredible Machine are physics puzzlers. Portal and QC are merely the latest variation on the adventure game genre: Objects are used inside a world and within a narrative framework in order to unlock access to new parts of that world. The nature of the world or even the puzzles is not as relevant as the structure of the entire game.

The second question is more interesting. Just like Alfred Hitchcock returned to the "wrong man" theme or David Cronenberg explores themes of transformation, game designers can also develop their pet obsessions and stylistic strengths. In the case of Quantum Conundrum, project lead Kim Swift makes a persuasive case that many of the motifs unique to Portal—on which she also served as project lead—are so rich with potential that they demand to be explored in new and different ways.

Gaming is still young enough that we don't really have our own "auteur theory," in which a designer can make a credible claim to being the author of a work which is imprinted with that designer's unique sensibilities. You can look at five minutes of a Ken Russell or Stanley Kubrick movie and know who directed it.

Very few game designers can make a similar claim: maybe Tim Schafer, Sid Meier, Warren Spector, Ken Levine, Will Wright, and a few others. In time, we'll probably add Kim Swift to that rarefied company, and Quantum Conundrum certainly makes a good case for her admission, but the whole issue of whether or not games can have a single author (or if even films can) is a complex question. In film terms, we're still in our D.W. Griffith phase. We need more time at our backs to really understand what this medium can do, and whether or not there even can be an Orson Welles of gaming.

You can follow Thomas McDonald on Twitter: @StateOfPlayBlog.

Web Full of Baddies, Says Google

If your guard wasn't already up when surfing the web, it should be now after Google revealed in a blog post just how many badware-peddling sites are online. A lot. As Niels Provos of Google's security team put it: "We find about 9,500 new malicious websites every day. These are either innocent websites that have been compromised by malware authors, or others that are built specifically for malware distribution or phishing." Google's doing its part to try to protect users via its various warning systems. Provos says that 12 to 14 million search results carry Google's "This site may be compromised" warning each and every day, with an additional 300,000 downloads being flagged as malicious by Chrome's download protection service. **–BC**

Verizon Intros Flippin'-Fast 300Mb/s FiOS

Remember when 56.6K dial-up modems were the cat's meow? My, how we've grown up in the past couple of decades. So has Verizon, which just unveiled new FiOS Internet tiers and pricing, culminating in FiOS Quantum with blistering-fast downloads (up to 300Mb/s) and scorching uploads (up to 65Mb/s), which will set you back $210 per month, or $205 per month with a two-year contract. To put the new speed in perspective, Verizon says it would take 1.4 seconds to download 10 songs (50MB each) at 300Mb/s. And to download a 5GB movie or upload 200 photos (250MB each), it would take 2.2 minutes and 31 seconds, respectively, on FiOS Quantum. **–PL**

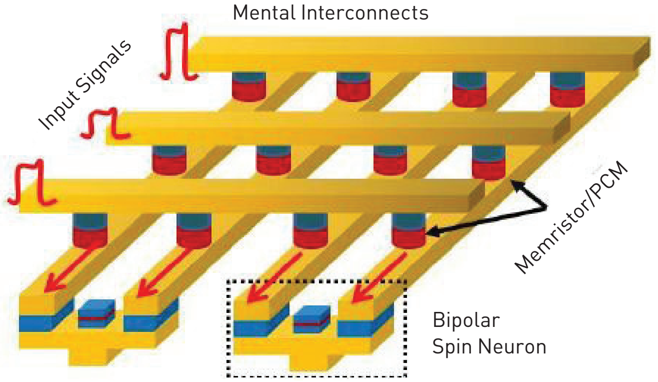
Intel Plans Brain-Like Neuromorphic CPUs

Intel researchers have published a proposal for a new, neuromorphic chip design—hardware that mimics the human brain.

Intel's technique differs quite a bit from IBM's cognitive chips, which were first announced almost a year ago. While IBM's brain chips use traditional silicon circuits containing so-called "neurosynaptic cores" with "programmable synapses" and "learning synapses," the method proposed by Intel instead uses multi-input lateral spin valves and memristors. The LSVs are itty-bitty magnets that change their magnetism depending on the rotation of the electrons coursing through them, while memristors either increase or decrease their electrical resistance depending on the direction of the electrical current's flow.

The Intel researchers say that by arranging these parts into specific configurations, the LSVs can basically act as neurons, while the memristors mimic synapses. They also claim that the neuromorphic CPUs are amazingly energy efficient, using 15 to 300 times less power than current CMOS technology.

The group claims that the chip would be good for processing tasks similar to what humans do, such as "analog-data-sensing, data-conversion, cognitive-computing, associative memory, programmable-logic, and analog and digital signal processing." One big caveat: At this stage, Intel's neuromorphic CPU is entirely theoretical, while IBM's brain-clone is already a prototype. That being said, you can read all about Intel's neuromorphic chip in the company's white paper proposal: bit.ly/L5H7HT. **–BC**



Quinn Norton
Byte Rights

RON VS. RON

YEARS AGO, those who wanted to create incredibly restrictive laws on Internet freedoms figured (correctly) that if people found out what they were doing, the people would throw a fit. So instead of negotiating the Anti-counterfeiting Trade Agreement (ACTA) at the World Intellectual Property Organization, as these things were usually done, they created the ACTA in secret meetings.

People did find out about ACTA anyway and threw said fit. The next generation of horrific Internet restrictions—the IP chapter of the Trans-Pacific Partnership—was created in even deeper secrecy. All we know for sure about the current text of TPP is that, like a Lovecraftian Tome of Elder Gods, it must be hidden from the eyes of sane men.

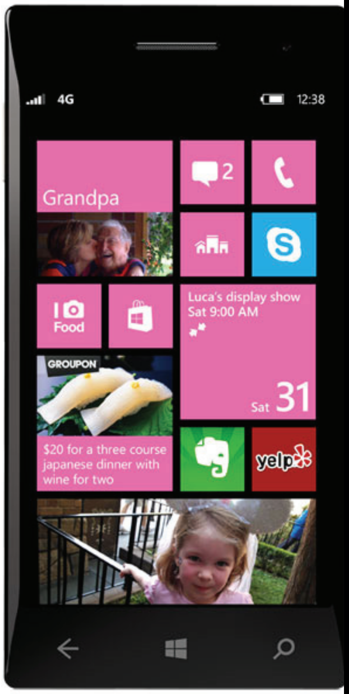
It's so secretive that the U.S. Trade Representative Ron Kirk has gone rogue and won't let his boss, the U.S. Congress, see the text. While it's valid to ask why IP agreements should ever be negotiated in secret, the idea that the elected representatives in charge of trade agreements are being barred from seeing those trade agreements while industry and their groups (MPAA, RIAA, PhRMA, etc.) have full access to them is extra insane.

Ron Wyden (D), Senator from the Internet (also Oregon), keeps trying to sneak a peek at the text of the TPP and keeps getting turned away. Some people express themselves through painting, others through interpretive dance. Senators work out their feelings through legislation. Wyden is proposing the Congressional Oversight Over Trade Negotiations Act, which would require USTR to let Congress see the damned TPP. While it's ridiculous that it's come to this, the bill is a way of saying to USTR that no, really, government should get the same access to negotiations of sovereign law that Disney does. And if they can't, it gets ever-so-slightly harder to call this a democracy.

Quinn Norton writes about copyright for Wired News and other publications.

Windows 8 Watch

Microsoft Previews Windows Phone 8



June was a busy month for Microsoft announcements. Besides dropping the bombshell of a Microsoft-branded Surface tablet for Windows 8, the company released details of the upcoming Windows Phone 8 (expected sometime this fall). Most significantly, the mobile OS will shift to the NT kernel, sharing many of the core elements of the desktop OS. This will make it easier for developers to code for both mobile and desktop apps, while still maintaining backward compatibility with existing apps. The shift also enables support for multicore processors and SD cards (as opposed to the spotty SD support found on WP7).

Another big change is NFC support. Combined with a new Wallet hub, this will allow users to store credit card and other membership/reward card information securely on their phones for easy financial transactions. You can also expect speech recognition via Audible.

Windows Phone 7 users, unfortunately, will be unable to upgrade to Windows Phone 8 on today's hardware, but an update to Windows Phone 7.8 will at least give them the new Start screen, which features different-size tiles and new colors. **–KS**

SSD Prices Way Down

If you watched HDD prices soar after the Thailand floods and found yourself grumbling that SSDs should be cheaper, good news! Using scads of data collected by Camelegg, The Tech Report found that SSD prices have dropped nearly 50 percent in the last year, with several models now below the coveted $1/GB price point. That's been sparked by competitive pricing wars between Crucial, OCZ, Corsair, and Samsung, with a lot of cuts coming from SSDs based on SandForce's super-popular controllers. The one stodgy holdout is Intel: Various versions of its 520 Series and 320 Series SSDs cost more dollar-for-data-wise than any other SSDs on the market, with the 40GB 320 Series SSD going for a whopping $2.31 per GB. **–BC**

Google's One-Two Tablet Punch

By now you've no doubt heard about Google's Nexus 7 tablet—the 7-inch tablet made by Asus that will start at $199 and presumably give Amazon's Kindle Fire a run for its money. The Nexus 7 is competitive not only for its price and superior specs—a 1.3GHz Tegra 4 quad-core proc, 1GB RAM, 1280x800 resolution, up to 16GB of storage, 1.2MP front-facing camera, and Android 4.1 Jelly Bean—but also for its close integration with Google Play. Previously called Android Market, Google Play will make it super easy for Nexus 7 users to purchase apps (naturally), as well as movies, TV episodes, books, and magazines (including *Maximum PC*!). Sound familiar? **–KS**

THE LIST

7 TECH TRENDS REVEALED AT COMPUTEX 2012

7

IVY BRIDGE ULTRABOOKS

Some standouts were the first Vaio-branded ultrabook, Toshiba's new ultrawide Satellite U-series, and the now-with-more-metal Acer Aspire Ultra M3.

6

TABLETS

All the major exhibitors were showing off Windows 8 tablets (some Intel-based, some ARM). Acer made waves with the Tegra 3-powered A110 Iconia Tab, which will sell for $200.

5

CONVERTIBLES

The most interesting of the bunch was the Taichi hybrid from Asus, which features two screens for seamless transitioning from laptop to tablet config. Most others featured a laptop body with a break-away tablet, like Asus's Tablet 600.

4

WINDOWS 8

Though we can't say how Windows 8 will fare with consumers, Computex showed that the OS has the full support of hardware vendors.

3

THUNDERBOLT

Thunderbolt is finally breaking out, with plenty of hardware on display that featured either end of the T-bolt connector, including Belkin's Thunderbolt Express Dock.

2

802.11AC

The new wireless standard had its coming-out party, with Qualcomm showing off 802.11ac-capable chipsets and Asus demoing an 802.11ac-enabled laptop and router.

1

THE CLOUD

Asus's "Open Cloud Computing" press conference was the largest of the show. Details are few, but it was yet another sign of the cloud's primacy to the vision of greater mobility and more-efficient hardware.

HEAD TO HEAD

BY BRAD CHACOS

Skype vs. Google Video Chat

The sheer power of video is well-known; we all remember what it did to radio back in the '80s, after all. But what would happen if video picked a fight with *video*? Curious, we tossed two of the top video chat options into a cage to determine the superior specimen. Skype may be the big man on campus, but Google's scrappy video calling plugin delivers the same features from within the Google ecosystem. There can be only one!

Round 1: Video and Audio Quality

Google video chat looks better, hands down. As you can see in the screenshots at right—which were taken with the same device, on the same network, in the same time frame—Google's picture is clean and clear.

Skype, on the other hand, is much more pixelated and blurry, though still serviceable. There are more glitches and momentary freezes in Skype's video calls. Don't get us wrong, Skype is totally usable—just nowhere near as smooth as Google video chat. These results stayed the same across multiple devices and networks.

The audio quality for both services is akin to talking to someone on a cellphone. As expected, group video chats degrade in quality as more users join in, though Google handles large groups better.

Winner: Google

Round 2: Device Support

Both video chat services do a bang-up job of supporting all the major operating systems, including Linux. The big difference lies in auxiliary device support. Google's desire to integrate video and voice calling into its ecosystem and Skype's focus on universal functionality come to a head here.

Google video chat is available on both Android devices and the iPhone via either the Google+ or Google Talk apps, but that's about it. Skype, on the other hand, makes video calls through its dedicated Android, iPhone, and Windows Phone apps, as well as a growing number of Smart TVs that either ship with Skype and a webcam or offer a webcam accessory.

On the social media front, Google video chat powers Google+'s Hangouts while Skype provides the muscle behind Facebook's video calling.

Winner: Skype

Round 3: Ease of Use/ Installation

Google video chat is a browser plugin rather than a stand-alone program, so installing it is a marvel of simplicity: Install the plugin, then restart your browser. Boom! Done. (The desktop Google Talk app doesn't support video calling.) The service uses your existing Google ID so most people won't even need to go through the hassle of setting up an account, though Google chats only work in Gmail, Google+, and the GTalk app.

Skype is a stand-alone program, so it takes a bit more work to set up. The process is straightforward, but downloading and installing a large program, then creating a Skype account takes much longer than setting up Google's video chat plugin.

Both services are remarkably easy to use: Just select a contact and start jib-jabbering. Chatting couldn't be simpler.

Winner: Google

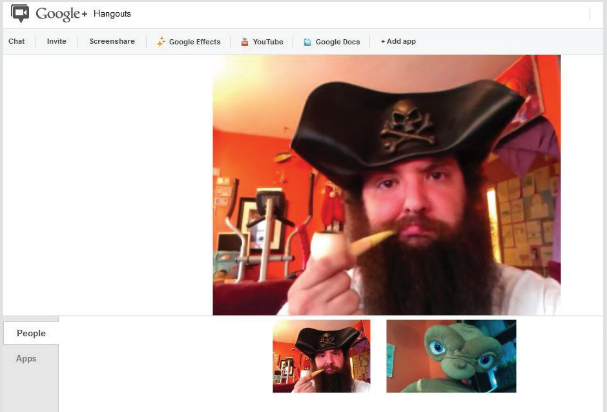
Round 4: Additional Features

Both services include the ability to make free voice calls to other members and low-cost calls to outside telephone lines, but Google one-ups Skype by offering free calls to the U.S. and Canada. Skype currently charges 2.3 cents per minute for domestic U.S. calls.

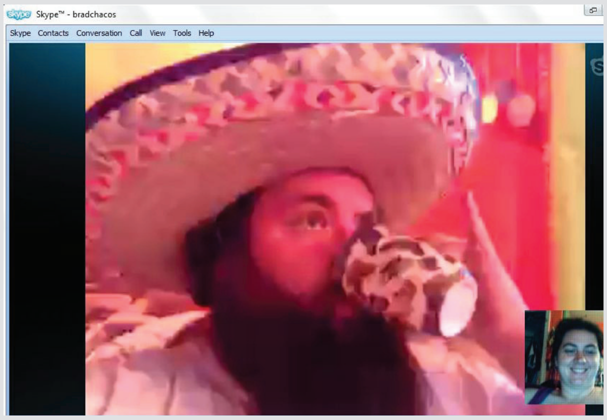
Google offers free, limited texting through Google Voice, but not directly through the video plugin itself. You need to pay 9 cents per domestic text with Skype.

Google also comes out on top during group video chats. Google+ Hangouts are easy, powerful, and support up to 10 simultaneous users, for free. The ability to edit Google Docs or watch YouTube videos as a group is a huge plus. Skype handles 10-person video conferences, too, but at least one person has to have a Premium subscription.

Winner: Google



Whether you're using it in Google+, Gmail, or the Google Talk app, Google's video calls come through crisp and clear. And the UI is very clean and intuitive.



My God, it's full of blurry pixels! Skype's audio and video quality isn't anywhere near as crisp as Google video chat's, but it still gets the job done. (Just not prettily.)

Round 5: Number of Users

This originally wasn't even going to be a category, but then we tried to actually use Google's video chat and none of our numerous Google contacts were online to serve as test subjects, aside from fellow professional tech dorks. Ditto the second time we went online... and the third... and the seventh....

Posting a request for help on Google+, where we have hundreds of followers, resulted in a couple of positive responses (thanks, Scott Davis and Trevor Foster!) and several comments along the line of, "Meh, I don't use that."

Skype, however, is virtually synonymous with video chatting and overflowing with active users. A key factor is the integrated Facebook functionality; your Facebook Friends also appear online with Skype. Finding people to chat with is a snap on Skype.

Winner: Skype

And the Winner Is...

What? Google video chat won three out of five rounds—including A/V quality, by far—and **Skype** still wins the crown? Yep, and here's why: Google video chat is a ghost town. Skype may not look as pretty or offer Google video chat's bells and whistles, but it's nevertheless an incredibly solid service with a user base that actually uses it. Your mileage may vary if you can convince your pals to board Google's bandwagon, however.

DOCTOR

THIS MONTH THE DOCTOR TACKLES...

> Windows Experience Index
> SSD Firmware Upgrades
> Random BSODs

What's in the WEI?

I just finished putting together a system with an Intel Core i7-2600K, 32GB of RAM, a Radeon HD 6900-series GPU, and a Seagate Momentus XT hybrid drive. A problem arises when I run the Windows Experience Index. My Processor, RAM, and Graphics subscores are above 7.5 but my Primary Hard Disk subscore is 5.9. What? That's the same as my 5,400rpm laptop drive! Is there something I'm missing?

—Techivan

THE DOCTOR RESPONDS: Because the Momentus XT's NAND is just used to cache often-used files, it's not going to make a big difference in stuff you only run once in a blue moon, like the Windows Experience Index. The good news is that your WEI score doesn't really mean anything. You'll see some speed improvements on boot and when launching programs you use all the time, despite your low WEI hard drive subscore.

Slipstreaming Windows 7

I need to reinstall Windows 7. Is there a way to get all the Windows Updates without reinstalling them one at a time? My original Windows disc is pre-Service Pack 1, so I would have to reinstall quite a few updates. There's got to be a better way.

—Chris Cameron

THE DOCTOR RESPONDS: Yes, you can use a free program called RT Se7en Lite (www.rt7lite.com), which uses your old installation disc to make a new one that slipstreams SP1 and other updates, as well as stripping out stuff you don't need (if you'd like).

Update My SSD Firmware?

I have three OCZ Vertex II SSDs in RAID 0, and they all have different firmware versions. I have no problems with them at all and was wondering if the benefits of updating the firmware to the latest version would outweigh the risks. I know that anytime you do a firmware update on anything there is always the chance of turning the device into a paperweight. Individually they each hit the 275-285MB/s advertised read/write speeds, but in the array they only manage between 700-735MB/s read/write. I know there is overhead in an array, but that seems like a bit much. Should I go for the update or stick to the old "if it ain't broke, don't fix it" tack? I would like to squeeze every last bit of performance out of my array before taking the plunge into LGA2011 later this summer.

—George Davis

THE DOCTOR RESPONDS: We checked OCZ's support page for the Vertex 2. It says, "Please do not update firmware unless absolutely necessary. Firmware updates may result in loss of user data and we recommend you back up your data before updating the firmware." So you should go with your gut on this one: It ain't broke, so don't fix it. That said, when you move over to LGA2011, you'll probably have to rebuild your RAID on the new system, so that's a perfect time to get all your data off of the array, update the firmware, and start with a fresh array and a clean slate.

Rate and improve your computer's performance

The Windows Experience Index assesses key system components on a scale of 1.0 to 7.9.

Component	What is rated	Subscore	Base score
Processor:	Calculations per second	7.6	4.9 Determined by lowest subscore
Memory (RAM):	Memory operations per second	7.6	
Graphics:	Desktop performance for Windows Aero	4.9	
Gaming graphics:	3D business and gaming graphics performance	6.2	
Primary hard disk:	Disk data transfer rate	5.9	

The Windows Experience Index: It's a very rough approximation of performance. Don't worry about it.

I Want the Full UEFI!

Doc, I finally upgraded from my tired Striker Extreme to an Asus P8Z68-V PRO/Gen 3 board. It seems pretty nice, but what is with the BIOS display? My only panel is a Panasonic TV, which I run via HDMI from my Nvidia GPU. Half the time, I only get half the UEFI screen. I can't find any way to change this. Is this upgrade one giant step back?

—Michael Marria

THE DOCTOR RESPONDS: Though you're having problems with

↘ submit your questions to: doctor@maximumpc.com

your UEFI displaying correctly on your TV, moving from a Core 2 to a Sandy Bridge Core i7 machine is not a step back. Your display issue is likely due to your graphics card, the HDMI connection, your television, or a combination of all three. Since the Z68 board has HDMI output, think about switching your HDMI output to the CPU's integrated graphics for any BIOS tweaks you have to do. You can then either run with the included Virtu software in D-mode (which passes the discrete GPU output through the motherboard display ports) or simply switch the HDMI cable back to your discrete card after you've done what you need to do in your UEFI. The Doc's gut feeling is that it's a problem with your television and how it interacts with your Nvidia card.

Upgrade or Bail?

I have an older IBM ThinkPad T43 that I continue to use, but I'd like to know if I can put a little more speed in it. Is it possible to upgrade the Intel 1.86GHz Pentium M to a faster processor? What do you recommend? It has 1.5GB of RAM, a 40GB HDD, and Windows XP.

— Mark Groch

THE DOCTOR RESPONDS: The Doc understands lost causes and has run a ThinkPad T60 far longer than he should have, upgrading it from a Core Duo to Core 2 Duo and upgrading the storage and RAM, too. But should you put money into an old war horse or send it to the glue factory? That's a very tough question.

You didn't say what chipset is in your T43 but it is likely running the 940GML on a 533MHz front-side bus. You should check this yourself using CPU-Z (www.cpuid.com) if you're not sure. The Doc has seen reports of machines from that era shipping with Pentium M or Celeron M CPUs, as well as some unconfirmed forum posts that Core Duo and Core 2 Duos may have shipped on that chipset from various notebook vendors. We wouldn't get carried away and start hunting eBay just yet, though: BIOS and motherboard support for a particular CPU can also pose a roadblock for you. We wouldn't buy a CPU for the T43 unless it was very cheap and we had confirmation from other T43 users who had successfully performed the upgrade.

At the very least, you can likely run the fastest Pentium M part, the 2.26GHz Pentium M, but expect heat. Even so, you're looking at only a 400MHz clock bump, not adding cores or changing microarchitectures. The Pentium M 780 is also limited to 32-bit support, so you won't be able to run 64-bit Windows.

Another reason not to sink money into the old T43 is the hard drive support. The T43, unlike the Doc's T60, only supports Parallel ATA hard drives and is apparently quite finicky on drive support. Even if you could find a PATA SSD, the capacity would be low and performance would pale against newer SATA drives. Did the Doc mention that the 940GML is limited to 2GB of RAM, too? As much as the Doc likes lost causes, it may be time to give up on this one.

Random BSODs Have Me Stumped

I'm really stuck, but before I perform major surgery on my new system, I thought I would ask the expert. My new system is a Gigabyte GA-X79-UD5 with a Core i7-3820 CPU. I used 16GB of Vengeance RAM, a Corsair H80 cooler, a Samsung 830 256GB, and a WD Black 2TB for storage. There are two Asus DVD burners installed and a Samsung Blu-ray drive. The GPU is a Radeon HD 6970. It's in a Corsair 600T case with a few extra fans and a Corsair TX850 PSU.

It runs fine most of the time, but locks up (no mouse or KB response) randomly at least once a day, and only resetting it fixes it. This can happen within five minutes or after several hours, but at least once a day. And no matter what I do, I can't overclock it even the slightest bit or it hangs on boot. I know there are people out there overclocking like crazy with a similar configuration, including you guys. I don't know what to try first, second, or third with this. Is my RAM bad? Am I running too hot, and if so, did I install the H80 wrong? The H80 fans are in push-pull and pulling in from outside. I connected both the Molex and small CPU fan connectors. Is that CPU fan connector *not* supposed to be used if you use the Molex? (Is it controlling the fan speed and overriding the H80 speed controller, which is on the high setting?) Do I need more fans? Is the CPU bad? What would you guys do?

— Jim Lawrence

THE DOCTOR RESPONDS: Random lockups can be one of the most difficult things to troubleshoot. The Doc would first start by loading defaults in the BIOS and also downloading the latest BIOS for the motherboard. Also think about disconnecting any extraneous hardware. Your use of three optical drives should not be a problem, but the Doc would disconnect two of the drives while you troubleshoot the issue. Any extra peripherals should also be disconnected until you can determine that they're not causing a problem.

Double-check all of your power connectors—perhaps a loose ATX12V/EPS12V connector is making an intermittent connection and causing the lockups and crashes. Speaking of power, you should be running a heavier gauge of power cable, like the one that came with your PSU, instead of just using whatever's lying around. We've had systems destabilize just because of a wimpy power cord.

Double-check that the RAM is fully seated. The Doc has seen badly seated RAM cause all sorts of weird problems. It usually manifests in RAM counts just slightly under the actual amount installed. If there isn't an obvious seating problem, start testing the RAM by downloading Memtest+ (www.memtest.org) and running it overnight. The X79 chipset hasn't been added to the program yet, but you should run it regardless. Just a note: While troubleshooting the problem, you should be running the RAM at standard speeds of DDR3/1333 to make sure timing isn't the issue

You have adequate cooling, but it sounds like you're not confident in the install. By the way, the two 3-pin connectors for your H80's fans should plug directly into the heat exchanger/pump unit of the H80, with the Molex connector providing power to the whole shebang and the 3-pin connector from the pump unit going to the CPU FAN header. You should think about monitoring the system temps using HWMonitor (www.cpuid.com) to see if the temps are spiking out of line. It's unlikely, but possible that the liquid block isn't fully attached and is causing sporadic lockups. At the very least, you should check that you've mounted it correctly first and then monitor it with HWMonitor while putting a thermal load on the CPU with Prime95 to see if that's the problem.

If all that is ruled out, it's time to look elsewhere. As we know, SSDs are a maturing category. You should check the firmware on your Samsung 830 to see if any issues are reported. In January, Samsung released a firmware update for the 830 drive that addressed a BSOD issue coming out of hibernation mode.

That's the easy stuff. If you're still getting the lockups, you may want to think about reseating the CPU on the off chance one of the pads didn't make a good contact in the socket. Consider pulling the entire board to see if you somehow have debris behind the motherboard or a standoff in the wrong place, which can short connections on the board and cause errors. If all that fails, it's possible you have a bad processor, which is extremely rare but does happen; or a bad motherboard, which is also rare, though not as rare as a bad CPU.

THE FUTURE IS NOW

By the Maximum PC Staff

DREAM MACHINE 2012 IS THE PC UTOPIA WE ALL LONG FOR

Conventional wisdom says that PC performance doesn't matter anymore. That's because the average consumer, the average gamer, and the average PC jockey can't tell the difference between a slow POS machine and a fast one. Well guess what, baby? That's a bunch of crap.

The truth is, the average gamer *can* tell the difference between a slide show and 110fps. The average consumer knows that a five-minute boot isn't good and the average PC jockey really doesn't like to wait five hours to encode a video. It's not that they *can't* tell the difference, they've just resigned themselves to the changing personal computing landscape, buying into the malarkey that portability and "the cloud" trump speed and power.

Well, not us. As power users our aspirations for an ever-more-capable, barrier-busting desktop rig never falter. For you, for us, and for all the PC enthusiasts who still give a damn, we present a preview of the utopia we envision: Dream Machine 2012.

This rig is lovingly crafted to be our most elegant Dream Machine yet, without compromising the thing that matters most: performance. To find out just what makes this year's Dream Machine tick, flip the page and commence drooling.

SLI
P9X79 WS
USB 3.0 Boost
Fan Xpert+
DIGI+ VRM
DIGI+ DRAM
SATA 6Gb/s UEFI BIOS
ASUS SSD Caching
Geforce GTX 690
EVGA
Hydro Copper
CORSAIR
AX1200i

PURE PC POWER

Each part was carefully selected for its ability to kick ass

1 Meet the Core i7-3975X
OK, not really. We completely made up that model number, but if this eight-core Xeon E5-2687W ever got a desktop equivalent, that's what we think it would be called.

2 The Pen Is Mightier!
This may look like a naughty toy from Good Vibrations, but it's actually the reservoir for our custom liquid cooling, featuring Mayhems Pastel Blue Berry fluid.

3 Maximum RAM
Corsair's pretty, new Dominator Platinum matches our décor, but it ain't just for looks. Rated to run at DDR3/2133, half can be used for a 5,000MB/s RAM disk.

4 Gang of Four
We've never seen quad SLI this well behaved before; it doesn't hurt that EVGA's GeForce GTX 690 Hydro Copper editions feature integrated water blocks to keep them on ice.

5 Power Hungry
We like our power supplies the way we like our watches, street racers, and steam trains: with lots of dials and switches. Corsair's new AX1200i gives you that, with a "glass cockpit" of gauges tunable from within the OS via USB.

SPECIFICATIONS

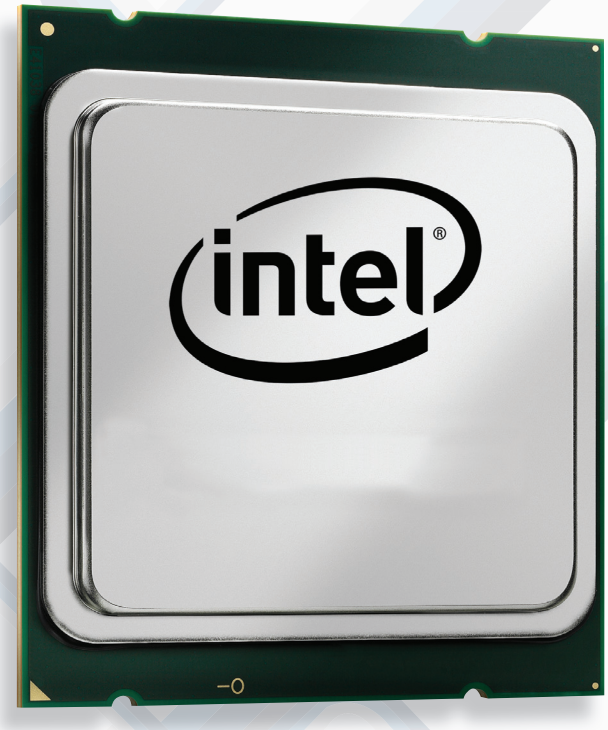
	MAKE/MODEL	URL	PRICE
CPU	Intel 3.1GHz Xeon E5-2687W	www.intel.com	$1,885
Motherboard	Asus P9X79 WS	www.asus.com	$380
RAM	64GB Corsair Dominator Platinum DDR3/2133	www.corsair.com	$899
GPUs	2x EVGA Hydro Copper GeForce GTX 690	www.evga.com	$2,400
SSDs	2x OCZ Vertex 4 512GB	www.ocz.com	$1,198
HDDs	3x 4TB HGST Ultrastar 7K4000	www.hgst.com	$1,587
Case	Silverstone TJ11	www.silverstonetek.com	$590
Paint Job	Smooth Creations	www.smoothcreationsonline.com	$700
Keyboard	Corsair Vengeance K90	www.corsair.com	$129
Speakers	Audioengine 5+	www.audioengineusa.com	$399
Mouse	Cyborg R.A.T. 7 Albino	www.cyborggaming.com	$99
PSU	Corsair AX1200i	www.corsair.com	$350
Monitor	2x Dell U3011	www.dell.com	$2,800
Cooling	Various (for details see page 32)	www.frozencpu.com, www.performance-pcs.com	$926
OS	Windows 7 Professional	www.microsoft.com	$140
TOTAL			**$14,482**

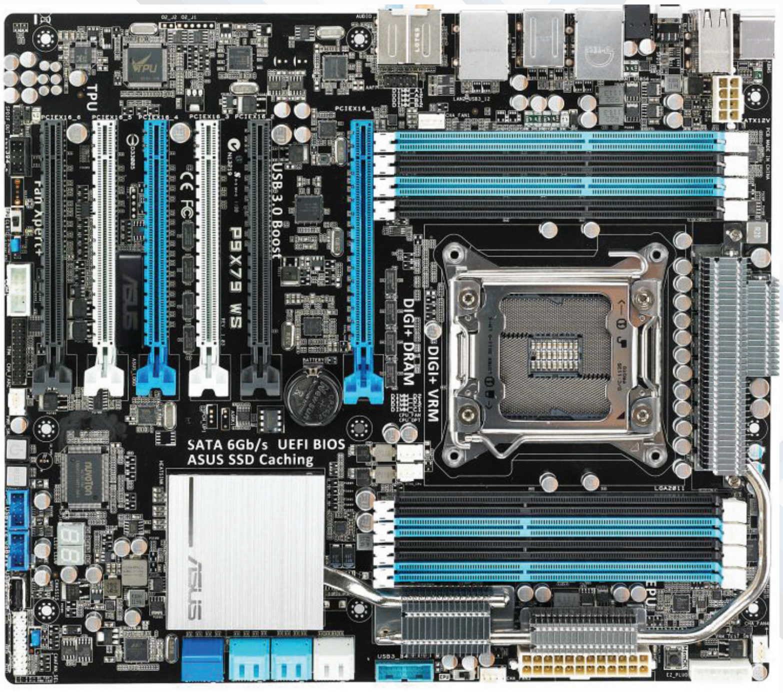
INTEL 3.1GHZ XEON E5-2687W

Eight is enough

Not to be disrespectful, but in some ways Sandy Bridge-E is a eunuch. After all, the Core i7-3960X is an eight-core CPU with two of the cores permanently switched off. The Xeon E5-2687W is full processor. All of the eight cores it was born with are ready and willing to work those threads for you.

Such multicorism isn't new to this year's Dream Machine—we've had DMs with eight cores and even 12 cores before, but never have we done it with a single-socket machine. Still, our choice of processor wasn't without controversy. Intel has reversed policy by locking down overclocking features on its Xeon CPUs, so our E5 can't hit the clocks we would have hoped for. That gave us pause and made us consider running a Core i7-3960X instead, even if two of its cores are walled off. But our desire to see all eight cores run free won out—with the E5 we no longer have to wonder what the original Sandy Bridge-E would be like if Intel had left well enough alone.





ASUS P9X79 WS

Workstation CPU, workstation motherboard

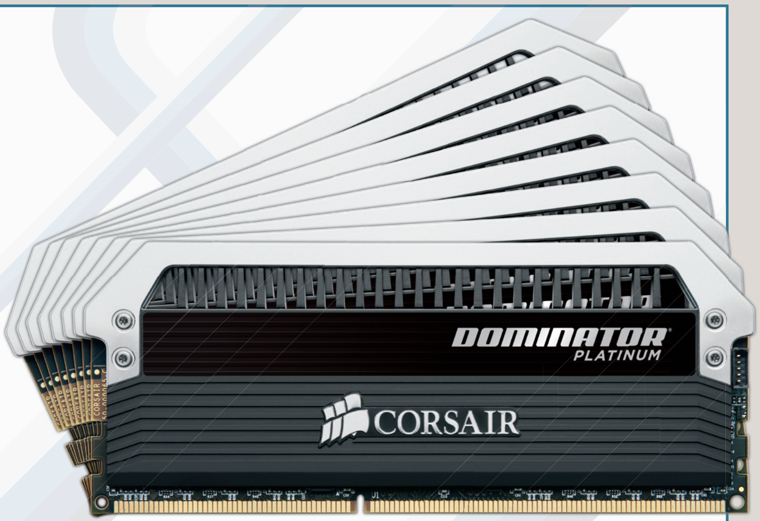
Obviously, our decision to go with LGA2011 and a workstation-class processor dictated the choice of dance partner. For that, we turned to Asus's P9X79 WS—a professional-class motherboard. It's not built for overclocking the way its Republic of Gamer siblings are, but that doesn't mean it can't hang. In fact, the P9X79 WS should do just fine with any unlocked i7 processor. The board features Intel LAN chips and for those who believe in GPU compute, the ability to run multiple cards. How many? The board is one of the few around that will support four-way SLI and CrossFireX in a standard ATX form factor.

Other professional touches include an internal USB port so you can plug in a USB dongle and a no-nonsense fit and finish. As with any performance-focused X79 board, it features eight DIMM slots capable of taking ECC and non-ECC RAM. One true test of a board design is how well it handles a full load of RAM with every DIMM slot loaded—the P9X79 WS says, "Bring it."

64GB OF DDR3/2133 CORSAIR DOMINATOR PLATINUM

Half for a RAM disk, half for Win7

With eight slots and quad-channel RAM support at our disposal, we decided to go for broke this year by maxing out the system RAM with 64GB of Corsair Dominator Platinum DDR3/2133. We did this not only because these modules looks pretty as hell, but also because we wanted to take advantage of lower RAM prices to run a large RAM disk. Not everyone needs a RAM disk, of course, but it's hard to argue with 32GB of storage that reads at 5,000MB/s.



2X 512GB OCZ VERTEX 4

1TB of SSD storage, at last

SSDs have come a long way since 2009, when we used our first SSD in a Dream Machine build. That SATA 3Gb/s 256GB unit cost $700. Today, we can get a 512GB OCZ Vertex 4 for roughly $600. Not bad.

For DM2012 we wanted 1TB of storage, so we tapped two Vertex 4 drives in RAID 0. With the X79 PCH set to RAID 0 and a stripe size of 128KB, we saw about 800MB/s reads and 1,000MB/s writes. That's Dreamy.

3X HGST ULTRASTAR 7K4000

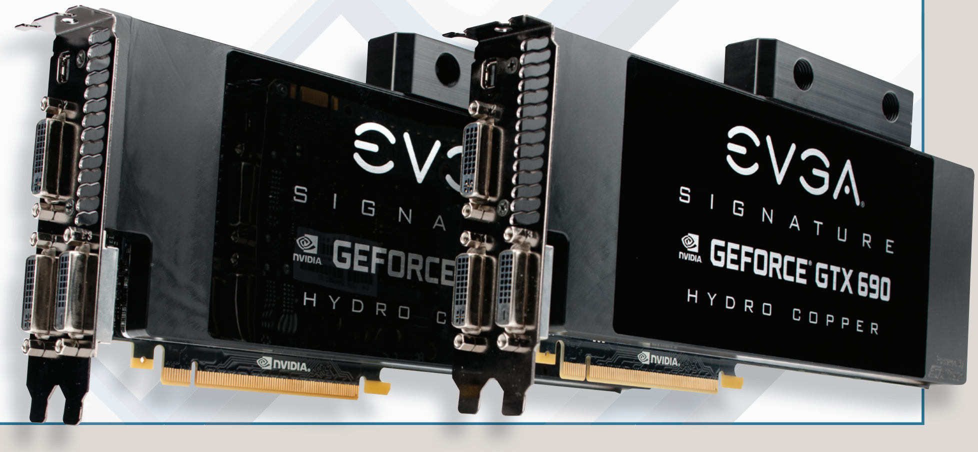
We'll never go hungry for space

With a 32GB RAM disk and 1TB of SSD storage, we were just getting started. Despite all the bellyaching you've heard about mechanical drives going away, they won't. Know why? We have way too much crap. So much so that we can actually use the 12TB of storage we're packing into Dream Machine 2012. This bounty was achieved painlessly with three 4TB HGST Ultrastar drives.

2X EVGA HYDRO COPPER GEFORCE GTX 690

The most powerful GPUs on the planet, on liquid

There's only one thing better than the most powerful graphics card on earth—two of them. And, yes, we did entertain the fantasy of four GTX 690 cards in octo-SLI but, sadly, the drivers don't exist. Normally, running dual-GPU cards comes with a compromise, but the power and thermal efficiency of the new Kepler architecture means our quad-SLI setup is damn near the same as running four GeForce GTX 680 cards. We'll leave you for now with that tantalizing thought. To get the full benchmark details, you'll have to flip to page 37.



SILVERSTONE TJ11

Designed for modding and painting

Consumer desktops may be getting smaller, but our Dream Machine seems to be getting bigger. The Silverstone TJ11 is so big, in some states you have to get a zoning variance to bring it home. It's so big, it has a power switch on top and bottom for those who can't reach that high. Even better, the case is designed with modding in mind. Instead of pop rivets and glued-on plastic panels, the aluminum case is screwed together, allowing panels to be removed for easy modding or, in our case, painting. The modularity of the case allowed us to pull the hard drive racks—normally stowed away inside the bottom—to make room for a massive 560mm water-cooling radiator.

ALL DOLLED UP: NO MERE PAINT JOB

SMOOTH CREATIONS U.S.A.

WHEN WE SAY that Smooth Creations (www.smoothcreationsonline.com) is probably the best paint shooter in the business, we say it having seen custom-painted high-end PCs from just about every boutique company in the country. Yeah, sure, invariably we'll get an email from someone saying the paint ain't that good: "Hell, I can do better in my garage with a rattle can of Rust-Oleum." From our own experience of being shade-tree case painters, we say, "Fat chance, Bubba!" You can't touch these paint jobs. Smooth will shoot the outside of a case for a mere $300, and will do both inside and out for $700. In our book, that's a bargain for a case that makes a serious style statement.

AUDIOENGINE A5+

Subwoofer shmubwoofer

We've long been fans of Audioengine's A5 speakers, and the A5+ builds on that heritage with a few subtle improvements that make them even better. Want the full skinny? Turn to page 82 for our review of this balling system.

CUSTOM LIQUID-COOLING LOOP

Well worth the hassle

As soon as we realized we'd be running a 150W Xeon processor and two GTX 690s, we knew we had to water cool. The TJ11 is a great air-cooling case, but the GTX 690's reference shroud blows air in both directions, which screws with the airflow.

The TJ11's bottom compartment can hold up to a 560mm radiator, so we grabbed a 560mm Black Ice rad and four 14cm NoiseBlocker fans to go with it. We added another 120mm radiator above the CPU. We kept the TJ11's two stock 18cm Air Penetrator fans to cool the RAM and the rest of the motherboard components.

We got our compression fittings from Bitspower, which also makes the reservoir, pump top, and chrome pump mod that transform our bog-standard Swiftech D5 pump into a thing of beauty. Mayhems Pastel Berry Blue concentrate prevents corrosion and algae growth while matching our case's blue accents.

The total cost for our water-cooling loop, including fittings, tubing, rads, fans, res, pump, and accessories, was $926, nearly $900 of which was spent at FrozenCPU.com and the remainder at Performance-PCs.com. You can see the full parts list here. We'd also like to extend special thanks to Daniel Cannon of Singularity Computers in Cairns Australia, whose long, incredibly detailed TJ11 water-cooling build logs on his YouTube channel (www.youtube.com/SingularityComputers) were enormously helpful in constructing our water-cooling loop.

PARTS LIST

EK Supremacy CPU Liquid Cooling Block - Nickel	$75
Black Ice SR1 Low Airflow Optimized 560mm Radiator	$188
Black Ice GT Stealth 120mm Radiator	$69
4x Noiseblocker NB-BlackSilentPro PK-2 140mm	$100
4x 140mm fan grill - Black	$16
Phanteks 120mm PH-F120S WT	$15
Danger Den Dreamflex Tubing - 3M	$30
6x Bitspower Compression Fitting BP-CPF-CC5	$48
2x Bitspower Black Ultimate Rotary Compression Fitting BP-MBRCPF-CC5	$19
4x Bitspower Dual Rotary 45-Degree Compression Fitting BP-45R2CPF-CC5	$60
Swiftech MCP655-B Pump	$90
Bitspower Pump Mod Top V2 - Acrylic	$50
Bitspower Pump Mod Kit - Chrome	$50
Bitspower Single D5 Top Upgrade Kit 150 - Black (BP-D5TOPUK150BKBKCL)	$50
1 Gallon Distilled Water	$2
250ml Mayhems Pastel Blue Berry Concentrate	$22
4x EK Uni Holder 50/70 Liquid Cooling Mount Adapter	$28
XSPC 140mm Radstand	$14
TOTAL	$926

CYBORG R.A.T. 7 ALBINO

It fits any mitt

There's no such thing as a one-size-fits-all glove, and you'd think the same truth applies to mice. But Cyborg's R.A.T. 7 Albino manages to meet the grip signature of any hand with its unparalleled customization options. Length adjustability, interchangeable palm rests, and pinkie grips are just a few of the ways you can tailor the mouse to your hand's needs.

CORSAIR VENGEANCE K90

Your fingers will feel the difference

To be frank, we didn't think any keyboard could ever get us to leave our coveted SteelSeries 7G, but after a week of pounding away on the Corsair Vengeance K90's Cherry MX keys, we were swayed. That's not even mentioning the brushed-aluminum deck, subtle LED backlighting, and programmable function keys. Yes, it would be nice if every key on the board were mechanical, but we're not complaining.

CORSAIR AX1200I

Know how much power your PSU is using

You know what makes us nerds? It's not that we can actually use a 1,200-watt power supply, it's that we want to know what's happening inside that PSU while we're using it. That's what Corsair's new AX1200i gives us. Just connect the AX1200i to an available USB header, load the monitor app, and you can not only monitor the power supply but actually tweak its voltages from within the OS. Let's not forget the seven-year warranty, reasonable price tag, and white cabling option.

2X DELL U3011

Because we need the pixels

We like to play games, hence the presence of quad SLI, but we also edit photos and videos and generally like an abundance of screen real estate. This year, we're taking it easy with our monitor choice and going with "just" two 30-inch panels—as opposed to last year's three. That hardly means we're slumming it, however. In fact, Dell's U3011, with its 2560x1600, wide-angle IPS technology, and 1.07-billion-color support is so superb that its $1,400 price seems like a downright steal. Such a steal, in fact, we got two.

LOOKING BACK: THE FIRST DREAM MACHINE

IT'S ALWAYS a good idea to occasionally take stock of your life by looking back at where you've come from. While it's easy to take current circumstances for granted, closer reflection can reveal the true magnitude of our progress. We certainly found that to be the case when we looked all the way back to Dream Machine Mk1. Unleashed on the world in September 1996, the Dream Machine staked out an insane amount of power, storage, and performance.

What made something a Dream in 1996? A 150MHz Pentium processor. That chip ran on a 66MHz bus, was built on a 350nm process, featured a whopping 3.3 million transistors, and contained no cache. That whopping 512KB of pipeline burst cache was mounted on the Supermicro P55-T2S mobo. To keep Windows 95 happy, a whopping 32MB of EDO SIMMs were used for RAM.

The Dream Machine was all about being the best, so EIDE was skipped in favor of an UltraWide SCSI III Quantum Atlas XP3125W drive with 2.1GB of storage. Yes, a $10 USB key has double the storage of the biggest, baddest hard drive you could find in 1996. We suspect that a typical USB key is actually faster than that hard drive, too.

Graphics in Dream Machine Mk1 came from a Matrox Millenium with 4MB of dual-ported WRAM. We paired the Dream Machine with a (then) massive 17-inch Nanao CRT, the ultimate PC display, with 1027x768 resolution and 24-bit color. DM Mk1 also featured a Zip drive, a Moto ISDN modem, a 6.7x Tosh SCSI CD-ROM, as well as an Adaptec 3940UW card and Sound Blaster AWE32 in an ISA slot. Oh, and for the keyboard, a classic IBM PC/AT.

The artwork for the original Dream Machine story seems apt—so diminutive are the parts by today's standards.

DREAM MACHINE 2012 IN ITS ELEMENT

Does performance even matter? Hells, yeah

Performance. Still. Matters. Don't let anyone dissuade you from that fact. It's a core belief we will hold at *Maximum PC* until they cart us all off to the soylent green factory.

This year's Dream Machine 2012 lives up to that philosophy: Get the very best you can. But it's meaningless without valid metrics. To measure how fast Dream Machine 2012 is, we turned to our new stable of benchmarks: Premiere Pro CS6, Stitch.EFx 2.0, ProShow Producer 5.0, x264 HD 5.0, Batman: Arkham City, and 3DMark 11.

When we picked our benchmark suite, we intentionally balanced the applications so as not to unfairly favor highly threaded processors. Yes, some of our benchmarks do take advantage of high-thread-count procs but two don't, and Dream Machine 2012, despite all its brawn, can't out-muscle our zero-point, and even the tiny Falcon Tiki (reviewed on page 74), in Stitch.Efx and ProShow Producer 5.0. Producer 5.0 tops out with four cores; after that it's the CPU's microarchitecture and clock speed that impact performance. Since Intel has clock-blocked our Xeon E5-2867W, the most speed we could get from the chip was 3.5GHz, with Turbo technically taking it to 3.8GHz under soft loads. With the same essential microarchitecture as Sandy Bridge, the zero-point's higher base-clock speed of 3.9GHz gave it a slight edge in performance in both Stitch.Efx 2.0 and ProShow Producer 5.0. But as we said earlier, Dream Machine is also about anticipating the future—and the fact is, more and more apps will add support for more cores.

In these scenarios the Dream Machine tells all others to just step the frak back. With our Premiere Pro CS6 benchmark confined to the CPU, the Dream Machine 2012 outran the zero-point by almost 20 percent. The same happened in the TechARP x264 HD 5.0 benchmark. That's no slow chip in the zero-point, either. It's a hexa-core Sandy Bridge-E overclocked to just under 4GHz. Even if we had goosed the SNB-E in the zero-point another 500MHz (just about the limit for most SNB-E chips) we doubt it would have won.

In gaming the contrast between Dream Machine and the zero-point was even more stark. Many have wondered if quad SLI scales, and we're here to say, "Damn straight." Dream Machine 2012's graphics performance in Batman: Arkham City gave up 67 percent more frames per second than the zero point and an 87 percent higher score in 3DMark 11. Let's remind you that our zero-point features a single GeForce GTX 690—not exactly chopped liver in GPU land. Against a single GeForce GTX 680? It's like having Thor's hammer land on your head. We saw a 262 percent speed bump with DM2012 against a stock Ivy Bridge box with a GeForce GTX 680 in Batman and a 176 percent bump in 3DMark 11.

We also wondered if the Dream Machine 2012 offers more where multitasking is concerned, given its 16 threads on tap. For comparison, we took our ProShow Producer 5.0 benchmark and ran it while also running the x264 HD 5.0 benchmark on this month's stupidly fast and small Falcon Tiki. The Tiki might have managed to spank the Dream Machine 2012 in the tests that don't stress cores,

but multitasking is another story. The Tiki was about 12 percent faster in ProShow Producer 5.0, thanks to its clock advantage and newer Ivy Bridge cores, but when ProShow is run with another task, you better go for a walk or do the laundry. The Dream Machine 2012 completed ProShow in 36 percent less time than the Tiki during multitasking, and it encoded at a 54 percent faster frame rate, too.

If you think these are silly, constructed tests that don't reflect real-world usage, think back to the days when your single core wasn't enough, and then your dual-core wasn't enough. Face it, Skippy, we're not living in the days when a heavy task was using Netscape and encoding an MP3 at 128Kb/s. Today, your quad might be good enough, but believe us, in the future, even a hexa-core machine will start to feel pokey.

BENCHMARKS

	ZERO POINT	
Premiere Pro CS6 (sec)	2,000	1,680
Stitch.Efx 2.0 (sec)	831	894 (-7%)
ProShow Producer 5.0 (sec)	1,446	1,552 (-7%)
x264 HD 5.0 (fps)	21.1	25.3
Batman: Arkham City (fps)	76	127
3DMark 11	X5,847	X10,906

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Our current desktop test bed consists of a hexa-core 3.2GHz Core i7-3930K @ 3.8GHz, 8GB of Corsair DDR3/1600, on an Asus Sabertooth X79 motherboard. We are running a GeForce GTX 690, an OCZ Vertex 3 SSD, and 64-bit Windows 7 Professional.

IN SEARCH OF THE PERFECT

OUR INTREPID CASE REVIEWERS SURVEY THE NEWEST ENCLOSURES TO SEE WHICH ARE WORTHY OF HOLDING YOUR PRECIOUS COMPONENTS By Nathan Edwards and David Murphy

MID-TOWER

It's been more than a year since our last big case roundup. In that time, case manufacturers haven't been idle. The USB 3.0 spec finally got an internal header, new competitors joined the mid-tower market, and the price of a great case has steadily decreased. We gathered seven of the newest and most exciting mid-tower cases, all priced between $100 and $160, and put our two most seasoned case reviewers to the task of separating the run-of-the-mill from the cream-of-the-crop. We'll leave no stone unturned and no metaphor unmangled. Yes, we're on the case.

ANTEC ELEVEN HUNDRED

GOES FAR, BUT NOT ALL THE WAY

The "fan controller" does little more than turn the top fan's LED light on and off.

IN A WEIRD TWIST, Antec has delivered a case that's both full on features and lacking in some of the company's staple design elements. Take, for example, the case's built-in fan controller—or lack thereof. We're used to being able to flick switches to independently control all of the fans within an Antec chassis, but after connecting a Molex to the provided circuit board in the Eleven Hundred—annoyance number one—we were displeased to find that the switch only turns the top 20cm fan's blue LED on and off. You can't physically adjust the speed of that or the case's rear 12cm fan.

Antec's big on allowances: You could stick up to seven additional 12cm fans in the system (including two uglier mounts on the case's side panel), in addition to six hard drives (using rails), two 2.5-inch SSDs, and three 5.25-inch devices. There's ample space for stuffing an XL-ATX, microATX, Mini-ITX, or standard ATX motherboard into the chassis, and we especially love all the cable-management tricks that Antec builds into the chassis: four rubber-rimmed holes for cable management (or water-cooling tubes), a huge hole in the motherboard tray for easier installation of aftermarket CPU coolers, and a big inch-wide space between the tray and the case's side panel for more cable management.

We love how the case's front panel pops off without a sea of wires dangling behind it, like those for the case's two USB 2.0 ports and two USB 3.0 ports (real headers, not pass-through). All in all, installing a system into the Eleven Hundred is a breeze, although folks with bulkier water-cooling setups might want to steer clear. This case offers plenty of potential; not perfection, but not a headache, either. **-DM**

VERDICT 7	**Antec Eleven Hundred**
	$100, ww.antec.com

SILVERSTONE TEMJIN TJ04-E

KEEP IT SIMPLE, STUPID

Every Silverstone case has one oddball feature. Here, it's the drive heatsinks.

SILVERSTONE'S TJ04-E is a modern take on a classic ATX mid-tower. It doesn't even have a weird motherboard orientation. That's not to say it's boring.

The TJ04-E is a steel case, matte black inside and out. Its brushed-aluminum front panel has beveled edges and contains four 5.25-inch drive bays. The case ships with three 12cm fans: an intake fan in the right panel, as well as top and rear exhaust fans, with room for an additional fan on top, on the side, and at the case's bottom. The TJ04-E has lots of drive room. One small cage holds *six* 2.5-inch drives, a pull-out cage holds eight 3.5-inchers, and the area below can hold either a 2.5- or 3.5-inch drive. To help with cable management, Silverstone included two of its four-in-one SATA power cable extenders.

The drives screw directly into the bays (upside down!), and the case ships with two heatsinks that attach directly to the sides of the drives to keep them cool. The SSD cage can also mount directly into the HDD cage—necessary if you have a long PSU.

The motherboard tray supports ATX, microATX, and Mini-ITX boards, and the tray has nine cable-routing cutouts and one large CPU backplane cutout. There's plenty of room behind the tray for cable routing, and there's even a compartment behind the PSU to hide extra PSU cables.

The build quality is solid, but the side panels pop off easily as soon as the thumbscrews are removed. The only front-panel connectors are two USB 3.0s (with internal header) and HD Audio, and the cables for both are quite long. At $160 for the version with the side window, it ain't cheap, but if you want refined good looks, great cable management, and a minimalist, classy aesthetic, the TJ04-E is for you. **-NE**

VERDICT 8	**Silverstone Temjin TJ04-E**
	$150, www.silverstonetek.com

CORSAIR VENGEANCE C70

GET IT IN GREEN

This system is military-grade, minus a few small bumps and bruises here and there.

CALL US SUCKERS for military theming, but Corsair's Vengeance C70 is a beautiful steel case that's every bit as functional as it is fun to look at. The system sports a hefty arsenal: no fewer than six screwless hard drive trays and three screwless 5.25-inch bays, in addition to one 12cm fan in the case's rear and two directly to the left of the system's hard drive bays. You can add two additional 12cm fans to the system's front and two on top—arranged perfectly for a 240mm water-cooling radiator, if that's your calling.

The first thing you'll notice about the C70 is its handles. Specifically, the two carrying handles at the top of the case that make the chassis a breeze to move around. Two military-style latches secure each of the side panels in place—a feature that's as creative as it is useful, as you no longer have to bother with screwdrivers or thumbscrews just to get to your system's guts. The C70's front panel sports two USB 3.0 ports on an internal header and a fun flip-up switch for the reset button that makes you feel as if you're about to "fire zee missiles."

The C70 only supports ATX or micro-ATX motherboards, as the standoffs for either come built directly into the chassis. A hole in the motherboard tray simplifies the process of adjusting (or installing) aftermarket CPU coolers, and four cable-management cutouts (three rubberized, one bare) along with a few snap-locking mechanisms on the rear of the motherboard tray help keep your system's insides from looking like Medusa.

Tight PCI thumbscrews and fan filters that kept falling out of the case's bottom were two of our bigger frustrations with this otherwise svelte chassis. Like the military machine, this no-nonsense chassis gets the job done and then some. **–DM**

VERDICT 8

Corsair Vengeance C70

$140, www.corsair.com

MSI RAVAGER

CHEAP, BUT NOT INEXPENSIVE

Radioactive blue: the color that goes with everything.

THE MSI RAVAGER looks like it was extruded from Monster Energy cans. Its exterior is black-painted SECC steel with bright blue claw-mark decals, and the inside is black with the mobo tray, drive trays, slot covers, and optical bay mechanisms picked out in bright blue.

The Ravager has six HDD trays (all with SSD mounting holes), three toolless optical drive slots, and seven PCIe expansion slots. The top hard drive cage is removable, though there's plenty of room for extra-long graphics cards even with the cage in place. The mobo tray has four cable-routing cutouts, a CPU backplane cutout, and plenty of tiedowns.

The Ravager ships with one 12cm intake fan and one 12cm exhaust fan, and can take two more 12cm or 14cm fans on the side panel, two on the top, and one more 12cm fan on the front, although only the stock front fan is filtered. Strangely, the front fan uses a Molex connector rather than a standard fan connector—and the power LED uses Molex as well, instead of the normal front-panel connector pins. The case's top panel contains two USB 2.0 ports, two USB 3.0 (internal), and audio jacks.

The build quality of the Ravager leaves much to be desired. The front panel is built of plastic so cheap that half of the mounting posts had snapped off before we opened the box. The hard drive trays are flimsy, and the PCI thumbscrews are just regular screws wrapped in blue plastic, which left shavings everywhere each time we used them.

The Ravager would be an OK, if ugly, case at $50. At $100, it's insulting. For the same price you can get a much better-looking and better-constructed case from Fractal, Silverstone, Corsair, or NZXT. MSI should stick to the stuff that goes *inside* cases. **–NE**

VERDICT 6

MSI Ravager

$100, us.msi.com

CORSAIR OBSIDIAN 550D

THE SOUND OF SILENCE (AND THE HEAT, TOO)

This system covers the inside of each panel in acoustic foam.

CORSAIR'S OBSIDIAN 550D comes packed with sound-dampening acoustic foam (nearly half an inch on its side panel), but it's not just Corsair's dedication to quiet that has us wowed. It's the 550D's interactivity: Gaining access to most of the steel case's fan mounts (two 12cm mounts on the top, two preinstalled 12cm fans on the front, and two 12cm fan mounts on the case's side) only requires you to push on a panel. Out it pops and in you go. The case's side panels receive a similar treatment; just hit a button on the rear of the case and *bam*—you can take them right off.

Corsair continues this "touch" motif on the case's inside, where there's room for you to install four 5.25-inch devices (that automatically lock into place) and up to six 3.5-inch hard drives (using drive trays). PCI components require you to deal with thumbscrews. Not the best way to go about it, but one that's better than normal screws, at least.

We have to call out the Obsidian's excellent cable-management techniques. Four rubberized holes and two bare holes give you easy means for stringing and concealing cables—like the big one for the 550D's two front-panel USB 3.0 ports. Since the actual space for an ATX or microATX motherboard is recessed on the tray, the flip side delivers plenty of recessed space for aligning your cables. We love this bit, since mashing a ton of cables between the flat back of a motherboard tray and the case's side panel is never a fun task.

While we like that this foam-filled case cuts down on noise, the 550D will get hotter than most cases on the inside, and it's a bit heavier than you might expect. Perhaps Corsair could have alleviated its cooling issue by using larger fans. -DM

VERDICT	
8	**Corsair Obsidian 550D** $160, www.corsair.com

NZXT PHANTOM 410 GUNMETAL EDITION

ONE OF THE BEST-LOOKING MID-TOWERS

We like the fan controller, but we don't dig the tangle of cables it requires.

THE PHANTOM 410 inherits the good looks of its full-tower predecessor but adds some tweaks of its own. It's a great-looking case in any color (we've used white and red for builds), but the gunmetal gray is spectacular. The paint is thick and luxurious to the touch, enough to give the Phantom 410 a much better feel than the MSI Ravager, which uses similar chassis tooling. Like the full-tower Phantom, the 410 has plastic shrouds on the top and front panels, which increase the size of the case (and make it impossible to rest anything on top). The top shroud contains two USB 3.0 ports, two USB 2.0 ports, audio jacks, and a three-speed fan controller—as well as the *seven* fan-control cables that lead from it.

The Phantom 410 hides three 5.25-inch drive bays behind a front-panel door, and has six drive trays. The top four drive trays are in a removable cage with an adjustable fan mount on it.

The case ships with 12cm front and rear fans and a 14cm top fan, with room for another 12cm front fan, 12cm or 14cm top fan (or 240mm radiator), two fans on the side, and one on the bottom.

Half of the motherboard tray's six cable cutouts are grommeted, though the grommets tend to fall out at a moment's notice. The mobo tray, per today's standards, includes a large CPU cooler cutout. There's plenty of room for cable routing behind the mobo tray, which is good, because otherwise the welter of fan cables would be *really* annoying.

Our other gripe with the Phantom 410 is not unique to that case: It shares the Switch 810's drive trays, which have the SSD mounting holes the wrong way around—annoying, but not fatal. At just $100 for a solid, great-looking case, this is a steal. -NE

VERDICT	
9	**NZXT Phantom 410** $100, www.nzxt.com

THERMALTAKE LEVEL 10 GTS

DARING TO BE DIFFERENT, BUT FALLING A LITTLE SHORT

A single SATA power cord is split to each hotswap bay.

THE LEVEL 10 GTS is a mid-tower based on a full-tower based on an overdesigned concept chassis, and the form factor has lost something in translation at each step, resulting in a chassis that's a bit, well, weird.

While we love the *concept* behind the case's four side-loading hotswap bays, pray that you never lose the security key that locks them into place, or you'll never be able to remove them. Also, you still have to screw a 2.5-inch or 3.5-inch drive into the case's trays before inserting them, limiting the "hotswap" part of the deal.

One more drive bay and four 5.25-inch bays (with handy locking mechanisms) round out the front of the case. That's a lot of potential storage for a system that feels a little bit cramped even with a standard ATX build inside of it. That can be alleviated somewhat if you make ample use of the case's four rubber holes for cable management, but the width of the case makes it feel a bit tight.

The Level 10 GTS comes with one big, blue 12cm fan in the front to cover the drive bays and a single 12cm fan in the rear. The top supports the installation of one 20cm fan or two 12cm fans (or a radiator!), and the side panel has room for a huge 14- or 20cm monstrosity.

Two USB 2.0 ports join two USB 3.0 ports on the case's front (via internal headers), arranged vertically, and the rear of the motherboard tray comes with about an inch of clearance between it and the side panel for cable management.

We don't like the lumpy aesthetic of the Level 10 GTS or the few extra steps it inserts into the building process, whether due to "coolness" attempts, minor design frustrations, or cramped conditions. **–DM**

VERDICT 6

Thermaltake Level 10 GTS

$110, www.thermaltake.com

THE LAST WORD

Seven cases. Two case testers. A whole lot of opinions

Nathan: The Antec, NZXT, Silverstone, and Thermaltake cases gave us the best CPU and GPU cooling, with the Ravager and the Corsair cases coming in a bit hotter.

David: I don't like it when manufacturers lean too heavily to one side of the style/performance equation. I'm shooting eyes at the Thermaltake Level 10 GTS now.

Nathan: Well, that one's a takeoff on a takeoff. Something was lost in translation.

David: I liked the Corsair C70, but I'm a sucker for good, functional design. I wish it had more ports on the front.

Nathan: That was my gripe with the Silverstone. And at $160 it's pretty expensive. I'm surprised you liked the Antec as much as you did. It seems pretty minimal.

David: There's a lot of room to grow. It's a fine $100 chassis, especially if you need a good way to pack a ton of components into a mid-tower. For frills, look elsewhere.

Nathan: The Eleven Hundred would have been a great deal two years ago, but these days $100 gets you a hell of a lot more. The Phantom 410, for example, looks and feels better than the Antec *and* has a functioning fan controller.

David: The Eleven Hundred sure beats the MSI Ravager!

Nathan: I was disappointed with the Ravager. Even if its build quality had been better, it'd still be ugly. The real problem, though, is the price. At $40 it's a maybe. At $100? No way.

David: Hey, at least it has interesting colors! It's tough to find that perfect mix of looks and performance, but I think I have to give the nod to the Phantom 410.

Nathan: Yeah, it's the all-around winner for me. The Silverstone case is great for people with a lot of drives who prefer a simpler look.

David: As for the Corsair 550D, I get nervous when I see acoustical foam in cases. It cuts down on noise, but at the cost of cooling.

Nathan: You can't just smack hot, loud parts into it; you'll just have a hot, quieter PC. But for a quiet build, I could see the 550D being great.

BENCHMARKS

	Antec Eleven Hundred	Silverstone TJ04-E	Corsair Vengeance C70	MSI Ravager	Corsair Obsidian 550D	NZXT Phantom 410	Thermaltake Level 10 GTS
Idle CPU	21	20	24	22	24	21	21
Idle GPU	45	43	47	45	48	41	47
Burn CPU	45	43	58	47	52	44	41
Burn GPU	88	85	90	91	91	88	87

All temperatures measured in degrees Celsius. All systems tested with a stock-clocked AMD Phenom II X6 1055T on an Asus Sabertooth 990FX mobo with a Cooler Master Hyper 212+ cooler, a GTX 480 GPU, 4GB DDR3/1600, and an 800W PSU in a room with an ambient temperature of 22 C.

RECOVER AND RESTORE

FILE AND DISK RECOVERY SOFTWARE CAN SAVE THE DAY WHEN YOUR DATA HAS BEEN DELETED OR CORRUPTED

BY RICHARD COBBETT

Cold sweat beading on the brow. Panic rising from the stomach. The shaking hand that scrolls the mouse in a vain attempt to locate that incredibly important, but absent file. These symptoms will be all too familiar to anyone who has accidentally deleted a file, or found that a hard drive or USB stick they've been relying on has become corrupted. While the Recycle Bin sometimes catches accidentally deleted files, there's no guarantee of that, and Murphy's law dictates that you'll empty the Recycle Bin just before you notice your mistake.

Luckily, there's a range of software available that can trawl your hard drive and reconstruct lost data. While the programs themselves aren't glamorous, they possess fascinating capabilities that prove that very rarely is anything truly deleted or lost, unless you somehow drop the hard drive into a vat of acid. While this fact has obvious security implications if you ever chuck out or give away an old PC or hard drive, the usefulness of recovery software cannot be denied.

Of course, it's incredibly important to make the right choice if you're going to trust a piece of software to recover your files. As you'll see in this roundup, while a lot of the products offer similar features and produce similar results, there are big discrepancies in price. We put eight file recovery programs through their paces to find out which ones you should trust.

BINARYBIZ VIRTUALLAB

Great recovery app, poor pricing

VIRTUALLAB IS an impressive performer, with one unfortunate twist: its pricing model. You don't buy it as an individual program. Instead, you pay as you go, and $40 is only worth a pathetic 100MB of recovered files. And if that doesn't seem stingy, the next level up is $99 for 500GB. Putting a fixed limit on how much you can recover is odd, but to jump from effectively nothing to half a terabyte is just plain bizarre.

The tools themselves are excellent, though. While File Undelete is the obvious go-to utility, VirtualLab also handles standard partition recovery, supports Mac partition types, and will even have a go at recovering a RAID system. As far as undeleting goes, its regular scan is blisteringly fast and the tools it uses to search through what it finds are easily the best of all the programs here. You can browse the directory tree at will, search the recovered files for specific types, or look something up by name—and VirtualLab serves up results instantly.

Close investigation reveals that the rest of VirtualLab offers this kind of one-step-further care and attention. When recovering files, for example, you can save to a drive, but this is the only tool in this lineup that also lets you output files to an FTP server instead. On our test system, we had trouble with the application's photo tool—for some reason it turned up no images, despite having found plenty of both in a general File Undelete sweep. A shame, really.

But, ultimately, it's the pricing model that holds this tool back. You can try it out with a desultory 1MB of free recovery and see what it can save, but for practical use, you're looking at $100 for the 500GB version.

VERDICT 8

BinaryBiz VirtualLab

$100 for 500GB, www.binarybiz.com

BRIAN KATO RESTORATION

It says what it does, and does it

RESTORATION IS a quick-and-dirty data-recovery tool. Options? Choices? Forget it. Everything the utility does is presented on a single screen, and it's not very much at all. Pick a disk. Enter a filename if you're looking for something specific. Decide whether or not you want to be bothered by files with a size of zero. Press the "Search deleted files" button to scan your drive. Done.

In testing, Restoration turned up as many files as its competitors and offered a couple of advantages. It's only 400Kb in size, for example, and doesn't require installation. That makes it convenient if you only have one drive and don't want to risk overwriting the data you are trying to recover. It's also much easier to use than the Linux alternatives, and it's free.

The downsides are firmly interface related. There's no indication of how damaged files might be, no way to browse the tree of recovered files by directory, and searching is a slow process.

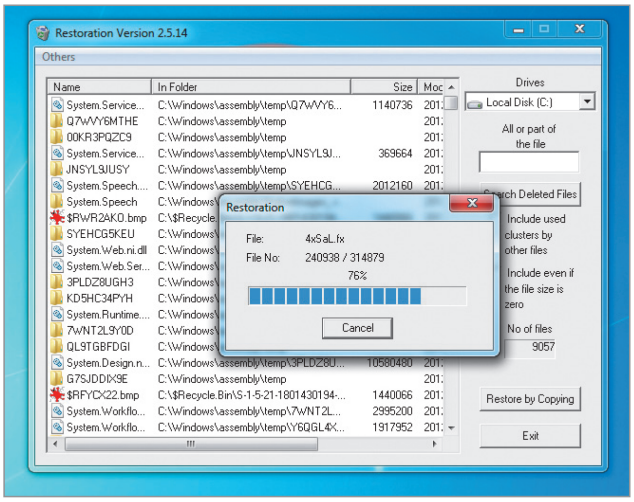
Most frustratingly, though, there's no way to restore multiple files at once. The list won't let you group-select or do a mass restoration of everything that's uncovered. The cut-down approach also means that you can forget about restoring from devices like cameras. Even USB stick support is brushed off in the Read me file as, "a user reported that it worked correctly." Finally, you're not likely to use the included shredder utility, as it zaps all the deleted files it finds, with no targeting whatsoever.

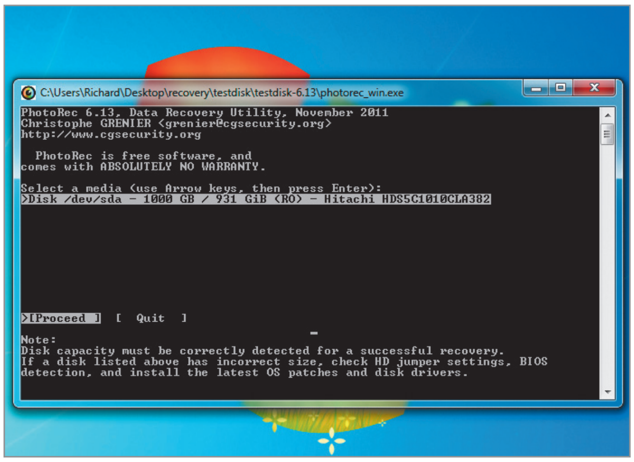
For a basic recovery tool it works well enough, but there's little reason to choose it over the more powerful utilities unless you're looking for a tool to go on a system-restoring USB stick.

VERDICT 5

Brian Kato Restoration

Free, bit.ly/katorestore





CGSECURITY TESTDISK AND PHOTOREC

A double-whammy of data recovery

WE'RE PUTTING these two open-source tools together because united they can take care of both data-recovery extremes. TestDisk is the broadsword. It works on whole partitions and non-booting disks—typically, in the aftermath of a virus attack or major human error. PhotoRec is the scalpel. It digs up individual files, from photos to videos, documents, and archives; it then reassembles them as well as possible.

Both come from the world of Linux, but PhotoRec, in particular, is easier to use than you might expect, with menus to flag the file types you want and a recovery process that spits everything onto a safe drive for you to sift through. It's as good at pulling information from memory cards as hard drives—an increasingly common feature in these tools.

TestDisk is a much more complicated beast, asking for details such as "disk geometry" and throwing out a stream of jargon. It features analysis tools that will try to work out many of the details if you don't know them, but don't expect to just hit a button and bring back your disks after a crash.

Both tools are small, and neither requires any form of installation. That makes them perfect for use on an emergency USB stick and custom recovery discs, and together they're not even a megabyte. As a rule, they'll be the go-to tools on any Linux-based disc. They're not the ideal tools to learn while sweating at the thought of losing a vital file, but they'll help keep you cool if you've already learned the ropes before disaster strikes.

VERDICT 9

CGSecurity TestDisk and PhotoRec

Free, www.cgsecurity.org

GENIE9 TIMELINE PRO 2012

Help put problems back in the bottle

GENIE TIMELINE Professional 2012 offers a different take on data recovery. It doesn't pick apart the detritus on your hard drive or try to salvage deleted files. Instead, it's a live backup tool. Install it, point it to another location (ideally a spacious second hard drive), and it keeps track of and copies anything that you add, delete, or change on your primary disk.

The main benefit of this is that you're not just protected against data loss, but far more common data accidents. Yes, Windows 7 boasts something similar, but it's not particularly useful on a minute-by-minute basis, especially if you accidentally overwrite something you've been working on all day.

Genie Timeline also provides a disaster recovery disc creator for pulling files from a broken system. It can scan everything on your system, limit its actions to specific folders, or look for file types such as pictures. It can also make a pseudo-backup of your iPod, for instance, though only by copying backups already made by tools like iTunes.

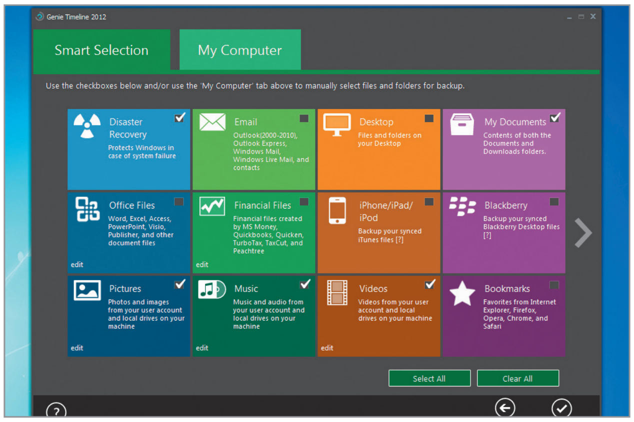
There are some oddities, however. Files aren't restored to their original location, but to a directory of your choice. This makes sense when working with undeletions—the more you mess with a drive, the more you risk damaging files—but here, a simple "put that back" button would be more fitting. Backups also work on a long timer—a minimum of three minutes—whereas tools like Dropbox work live.

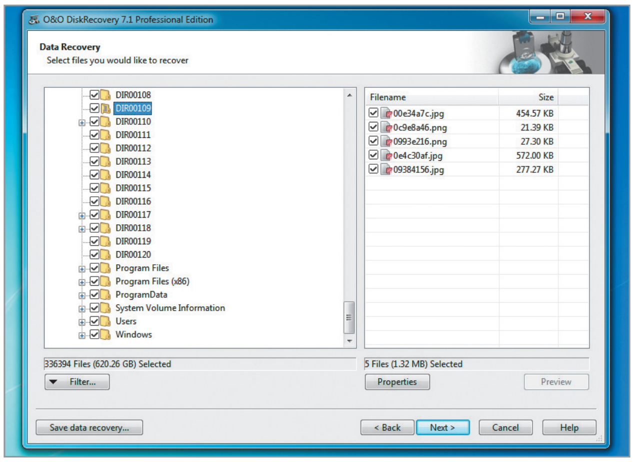
Provided you have a second drive, Genie Timeline Pro 2012 is a handy way to keep a copy of your most important files, with the advantage that you get something out of it even if disaster doesn't suddenly strike.

VERDICT 7

Genie9 Timeline Pro 2012

$60, www.genie9.com





O&O DISKRECOVERY 7

Bring your data back with ease

COSTING MORE than twice as much as many of its paid-for competitors, O&O DiskRecovery 7 is on the defensive even before it's installed. Its primary advantages are its ability to handle formatted and damaged partitions, and its very powerful engine that's used regardless of whether you do a quick or deep scan. It stumbles in some other functions, though, especially post-scanning.

This isn't to say it's complicated to use. In most cases, you just point it to the partition, pausing only to specify individual file types (if you don't want everything) and whether you want to save files automatically or be presented with a list.

Unlike many tools, you're not allowed to restore to the disk you're recovering files from—but that's good sense. The catch comes if you're looking for specific files. You can't scan for them exclusively, or even target directories—only file types, with the option to add a couple of filters, such as size and date of creation. The finished report offers no search box to help drill into it either—an unfortunate omission. The result is that while O&O works superbly if you have a crash or drive-wide disaster to take care of, it's not so effective for day-to-day deletions and recovering from small-scale accidents.

If you do end up needing its heavy lifting, there's not much that escapes O&O's eagle eye. It handles hard drives, flash cards, USB sticks, and more. Its partitioning support is extremely useful, and the option for an "Instant" installation if you're bringing it in to clean up is a handy touch. For the general home user, though, you can get similar results more cheaply elsewhere.

VERDICT 8

O&O DiskRecovery 7

$99, www.oo-software.com

PC TOOLS FILE RECOVER

A little too simple

FILE RECOVER is as simple as data recovery gets. Where others have several screens to wade through, here everything is provided on just one—the option to choose a quick scan, deep scan, or physical scan; to target only specific file types; and not much more.

It also offers a couple of less common options, such as the ability to target a single filename, and to recover files from a directory to the right-click menu. The latter may or may not be very useful, as it only performs a quick scan; deleted files are likely to have been moved to the Recycle Bin in any event, and therefore will not show up in the search. It also offers no support for cameras or other media devices.

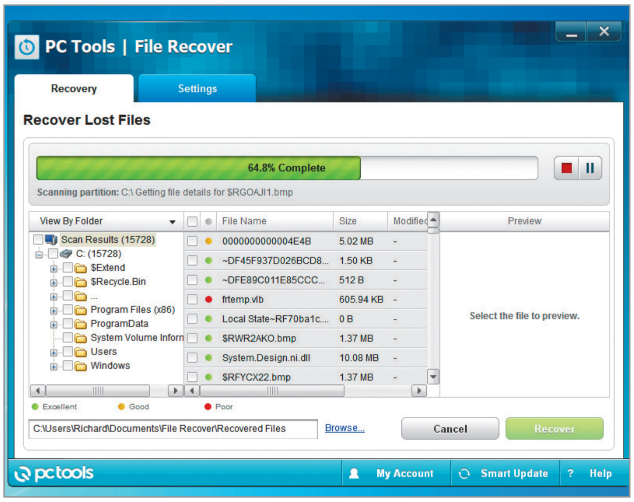
While File Recover has no trouble digging up an impressive number of files—if somewhat more slowly than many others here—its recovery screen is lacking. There's no way to filter the results of a scan after getting the list, nor to scan to see if it found a specific file. Recovered files are color-coded by how damaged they are, but that's all the detail available—no header information, for example, as in Recuva. Most frustrating, though, is that you can't resize the very small window, leaving the important matter of each file's location at the mercy of a scroll bar.

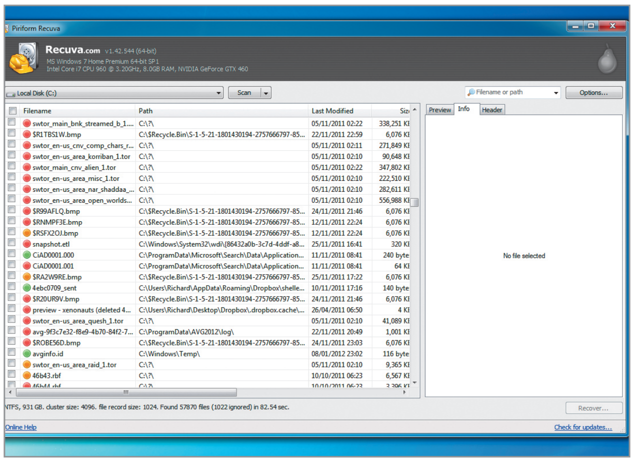
File Recover turned in a solid, but unexceptional performance. It's one of the easier tools to use, and while a bit slower than the others, its recovery performance was up to scratch. You'll probably miss the options on offer elsewhere, though, and it's worth noting that while the price appears much lower than many, it's a year's subscription rather than an outright purchase.

VERDICT 5

PC Tools File Recover

$30 a year, www.pctools.com





PIRIFORM RECUVA

A powerful and free solution

RECUVA IS AN amazing tool with only one serious flaw: It can't head back in time and install itself on your PC before disaster strikes. Beyond that, it does everything right. It's fast, it's easy to use, and best of all, it's completely free.

As with all tools, you get a standard scan and a much slower, deep scan. If you know what you want to retrieve, you can point Recuva toward individual file types, as well as destinations from the Recycle Bin to attached devices. Everything is presented in a simple list that can be sorted and searched. Files are flagged according to their quality: green for perfect, yellow for partially overwritten but possibly still of use, and red for unrecoverable. You might still be able to salvage something from the red camp, but don't expect Recuva to perform miracles.

You can select many files and recover them at once, but there's no direct way of putting them back where they came from as if nothing happened, although you can obviously do this by hand. As a bonus, you can also securely overwrite any files to prevent them from being recovered (at least without forensic tools), though file-names can still be found.

The only annoyance is when searching through potentially recoverable files. This is done via a live search box; the sheer number of files it churned through as we typed brought our quad-core i7 test machine to a crawl. On a full search, it's best to copy and paste queries instead of typing them in one letter at a time.

There's no good reason not to use Recuva. Other suites may have more tools, but nothing comes close to its value, reliability, and ability to save your bacon.

VERDICT 9 KICK ASS!

Piriform Recuva

Free, www.piriform.com/recuva

UBUNTU RESCUE REMIX

Data recovery for the sysadmin

UBUNTU RESCUE REMIX is the hardcore solution for bringing your data back to life, with one minor drawback—unless you're comfortable with booting from a live CD and only seeing a blinking cursor, it really isn't for you. There's no pretty GUI and no wizard to talk you through things—just a carefully chosen set of open-source tools with the power to bail you out of trouble.

Those tools are split into three categories: Filesystem, Disk, and Other. These include TestDisk, as seen separately here, along with Photorec for pulling back media specifically, and Magic Rescue for more general files. Working as a live CD means that there's nothing to install, which in turn means that you can pull the plug as soon as you realize you've deleted a file and have a good shot at getting it back.

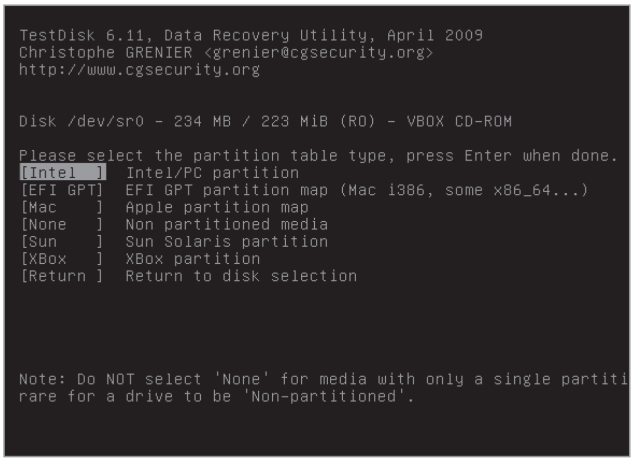
They're powerful tools, but choosing the wrong options and firing up the wrong programs can do more harm than your original accident. Together, though, they can do far more than any individual program here, and make for an excellent emergency rescue disc. Documentation is primarily provided in the form of manual pages on the disc itself, along with a cheat sheet, and tutorials on the web page that cover the basics.

If you'd like to try this pack out, the best way is with VirtualBox (www.virtualbox.org). Create a new disk, mount the ISO, and play around with the knowledge that you can't harm anything on your real PC. If it proves too much, other boot CDs are available, such as www.ultimatebootcd.com. That one includes TestDisk and Photorec, which are the main tools you'll use for regular file recovery.

VERDICT 8

Ubuntu Rescue Remix

Free, ubuntu-rescue-remix.org



FILE RECOVERY SOFTWARE COMPARED

SPECIFICATIONS

	BinaryBiz VirtualLab	Brian Kato's Restoration	CGSecurity TestDisk/ PhotoRec	Genie Timeline 2012	O&O DiskRecovery 7	PC Tools File Recover	Piriform Recuva	Ubuntu Rescue Remix
Website	www. binarybiz.com	bit.ly/katorestore	www. cgsecurity.org	www.genie9. com	www. oo-software. com	www.pctools. com	www.piriform. com/recuva	ubuntu- rescue- remix.org
Price	$100 for 500GB	Free	Free	$60	$99	$30 per year	Free	Free
Number of PCs	1	Unlimited	Unlimited	1	1	3	Unlimited	Unlimited
Dedicated Photo Recovery	Yes	No	Yes	N/A	No	No	Yes	Yes
Requires Installation	Yes	No	No	Yes	Yes	Yes	No	No
Works with Partitions	Yes	No	Yes	N/A	Yes	No	No	Yes
Integrated File Shredder	No	Yes	No	No	No	No	Yes	No
Quick Scan Time on Test PC	00:37:00	04:06:00	N/A**	N/A	00:17:00	06:37:00	01:24:00	N/A**
No. Files Found on Test PC*	58,131	60,453	N/A**	N/A	57,186	58,057	57,870	N/A**

* According to program. This doesn't guarantee successful recovery of detected files. ** No dedicated quick scan available for comparison purposes.

AND THE WINNER IS...

File recovery is an emotive subject. After all, you'll only seriously consider it when you're desperately trying to get an essential file back. And you won't be doing it in a calm fashion, either. You'll need something that can pinpoint the files in question, give you the good (or bad) news as quickly and clearly as possible, and then get those files back for you. Most of the applications we've looked at here do that to some degree or other, but as always, it's the details that matter.

The surprising revelation from this roundup is not so much that some utilities are more capable than others, it's the variation in pricing models employed. From the simply barking pricing of BinaryBiz's VirtualLab to the power of the utilities that'll cost you nothing at all, if you're looking at getting files back, you really can spend as much as you want to.

For once, paying more doesn't necessarily mean you get a better service, either. The two standout applications for us cost nothing at all, yet boast incredible raw power.

CGSecurity TestDisk/PhotoRec

When a free program wins our Kick Ass award, it can pose a bit of a quandary when selecting a runner-up. We felt that while TestDisk and PhotoRec offer amazing power and features for free, they don't match the user-friendliness of Recuva. You might notice that Ubuntu Rescue Remix scored well, but was only awarded an 8 verdict overall. This is because we just can't recommend it due to its complexity and the harm it could cause if not used correctly.

Piriform Recuva

It's powerful, full of features, works incredibly well, and is free. Is there anything not to like? While there's usually a catch or caveat following a sentence like that, Recuva manages to avoid such pitfalls. The best thing we can say about it is that it works well, is easy to use, and includes features that even some paid-for applications are missing. If you've lost a file and are looking for a quick and easy way to get it back, make sure you use Recuva.

iFixit presents:

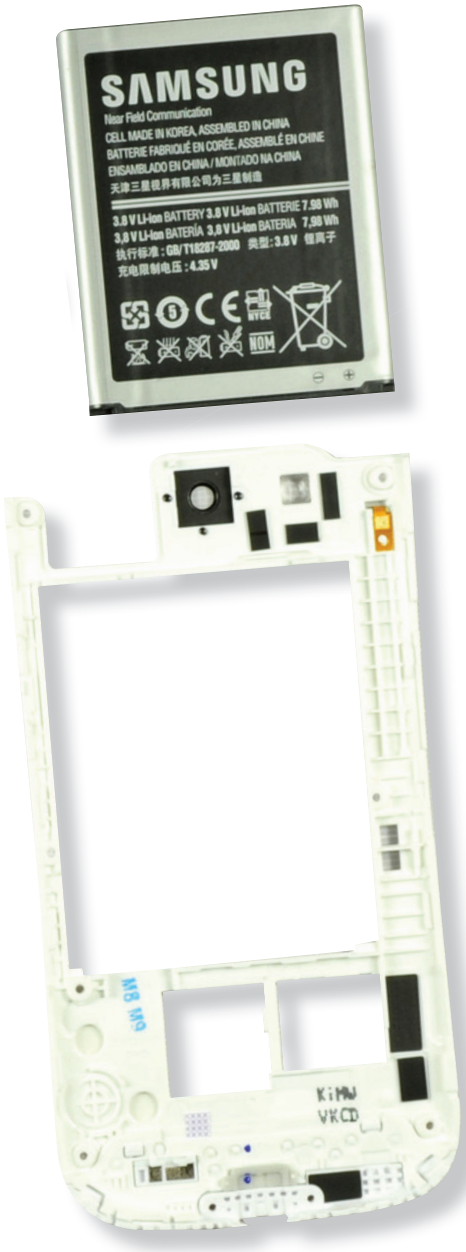
AUTOPSY

THIS MONTH WE DISSECT…

Samsung Galaxy S III

About iFixit

iFixit is a global community of tinkerers dedicated to helping people fix things through free online repair manuals and teardowns. iFixit believes that everyone has the right to maintain and repair their products. To learn more, visit www.ifixit.com.



MAJOR TECH SPECS:

The Galaxy S III's wee motherboard is home to a lot of chips. Note that this is the international version of the phone, so the specs will differ from those described in our review of the Samsung Galaxy S III on page 84.

- Samsung Exynos 4412 quad-core A9 processor with 1GB LP DDR2 Green Memory (K3PE7E700M-XGC2)
- Murata M2322007 Wi-Fi module
- Samsung KMVTU000LM eMMC (16GB) + MDDR (64MB) NAND Flash
- Intel Wireless PMB9811X Gold Baseband processor
- MAX77693 and MAX77686
- Broadcom BCM47511 integrated monolithic GNSS receiver
- Wolfson Microelectronics WM1811 stereo codec
- Skyworks SKY77604 multi-band power amplifier
- Silicon Image 9244 low-power MHL transmitter
- NXP PN544 NFC chip
- Infineon PMB5712 RF transceiver

KEY FINDINGS:

- The main 8MP camera sensor is a Sony BSI unit, which is essentially the same camera found in the iPhone 4S. Folks can finally compare Apples to Androids when it comes to picture quality.

- The back camera, at 1.9MP, should vastly outperform the VGA unit on the iPhone 4S.

- Samsung's inscription on the battery reads "Please refer to manual before using battery." Yeah, like that's gonna happen....

- The 3.8V, 2,100mAh battery incorporates the Near Field Communications (NFC) module used in "S Beam"—just like the Galaxy Nexus.

- That 2,100mAh is ginormous when compared to the iPhone 4S's 1,420mAh and the Galaxy Nexus's 1,750mAh units.

- The glass is fused to the display, and the display to the Galaxy S III's frame. This will greatly increase the amount of money one has to spend when replacing the glass, should one be unfortunate enough to break it.

- This is one of the first phones utilizing Corning Gorilla Glass 2, which according to Corning "enables up to a 20 percent reduction in glass thickness, while maintaining the industry-leading damage resistance, toughness, and scratch resistance." Interestingly, Corning only claims reduced thickness, not better damage resistance. While a 20 percent reduction in thickness is impressive, we'd like to see more effort toward creating robust and long-lasting devices.

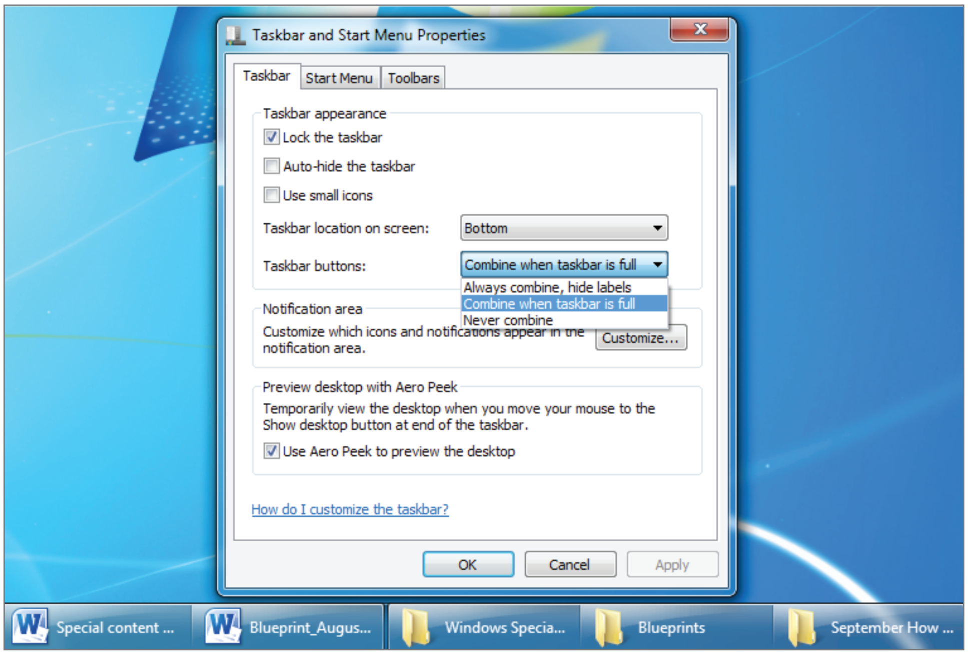
- A 13-inch MacBook Pro's display resolution is 1280x800. This phone has a 1280x720 4.8-inch display!

- A Melfas 8PL533 Touch Sensor translates your touch inputs into zeroes and ones.

HOW TO

STEP-BY-STEP GUIDES TO IMPROVING YOUR PC

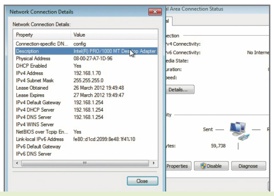
WINDOWS TIP OF THE MONTH

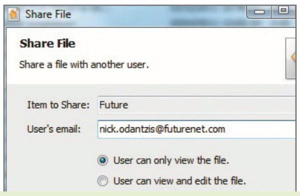


KEEP DOCUMENTS SEPARATE IN THE WINDOWS 7 TASKBAR

The Windows 7 taskbar was a huge leap forward, but it can sometimes take longer to switch between multiple instances of the same program, as Windows automatically organizes them into a single button. To disable this, right-click the taskbar, select Properties, and then click the drop-down menu next to "Taskbar buttons:" and select "Combine when taskbar is full."

MAKE - USE - CREATE





60 Wake Your PC with a Smartphone or Tablet

62 Manage Your Google Docs Offline with gExplore

ALEX CASTLE
CONTRIBUTING EDITOR

RECOVER A LOST DOCUMENT

THIS MONTH, I had one of the most terrifying experiences a writer on deadline can have: I forgot to save a document. When I opened up Word the next time, the document wasn't in the document recovery panel for some reason. After regaining my composure, I searched my entire system for the various ways a document can be saved:

.doc – Did I remember to save it, after all? No, I didn't.

.wbk – This is a Word backup file.

.asd – This is a word autorecovery file.

If you're really desperate, you can also search for .tmp files, and those starting with a tilde (~). Normally all this searching would be a chore, but Search Everything (my very favorite app) made the process take less than 30 seconds. Did I find my document? You're reading it right now!

↘ submit your How To project idea to: comments@maximumpc.com

Wake Your PC with a Smartphone or Tablet

YOU'LL NEED THIS

A PC CAPABLE OF WAKE-ON-LAN
We'll show you how to find out if your system fits the bill.

A SMARTPHONE OR TABLET
Android, iOS, or Windows Phone 7 will all work.

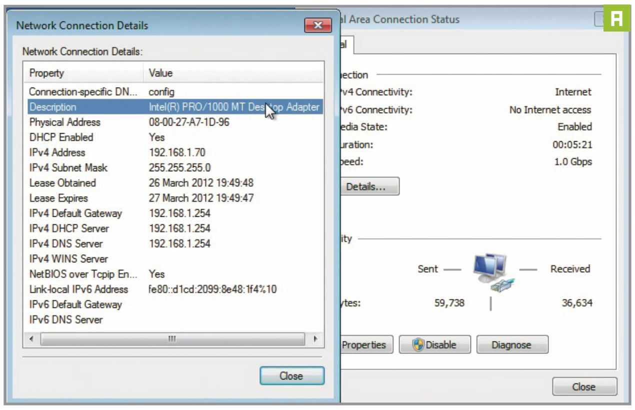
SOMETIMES YOU need a computer on and you need it on now! The power-saving features in Windows are fantastic—they can switch a desktop PC from using 300 watts to just one watt when it's not being used. The problem is that in a modern house where you're often sharing your music, video, and photos with others, if that PC goes to sleep or is switched off, someone will be shouting for you to turn it back on.

Thankfully, there's a little-known and obscurely implemented feature in most PCs called Wake on LAN, or WoL. This is the ability for a PC that's either switched off or sleeping to be awakened from its slumber remotely from almost any other device that's connected to the same wired or wireless network. By checking a few simple settings and installing a smartphone app, anyone can rouse a slumbering system remotely, so let's show you how. –NEIL MOHR

1 TAKE SOME NOTES

Networking is a complex subject. First, let's gather some useful information—prepare for lots of clicks! Down in the bottom-right of your desktop is the Notification area, where you'll see a network icon. Right-click this and choose Open Network and Sharing Center. Under the Connect or Disconnect section, click the Local Area Connection link if you use a wired connection, or the Wireless link if you're on a wireless network.

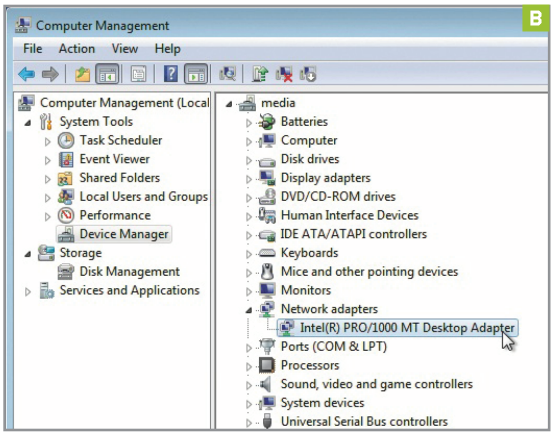
» Click Details in the new window that opens, and you'll be presented with the Physical Address code and the IPv4 Address, among other details **(image A)**. Write down both, as you will need that info later. Lastly, make a note of the Description—this is the name of the network adapter that's being used, which you'll need in the next step to see if your adapter will work.

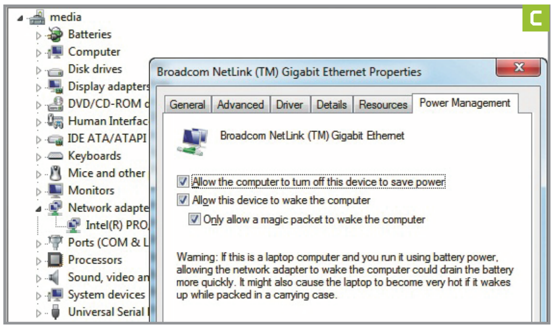


2 CONFIGURE YOUR NETWORK DEVICE

To ensure your PC can actually wake from LAN, you need to check the network adapter. To do this click Start, right-click Computer, and select Manage. In the Computer Management window that opens select Device Manager and open the Network Adapters branch. You'll need to double-click the adapter named in the Description from the last step **(image B)**.

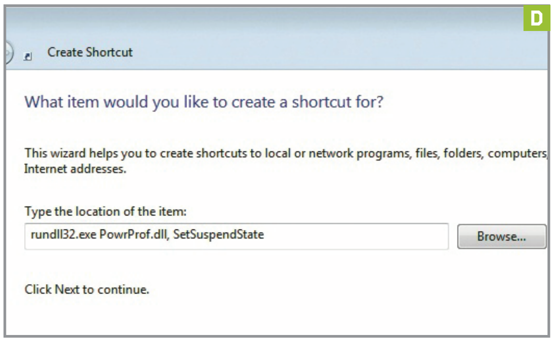
» Double-click your adapter to open its Properties. Now click Power Management; you need to check both boxes here at the very least, especially the one marked "Allow this device to wake the computer" **(image C)**. It's also worth taking a look through the Advanced tab for any WoL or Wake settings and making sure these are set to Auto, or that all available options are chosen.





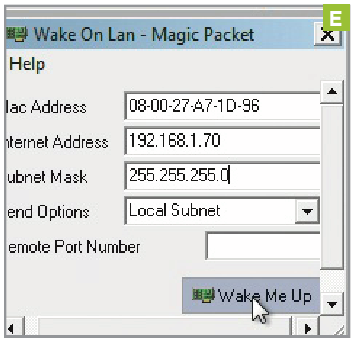
3 **CONFIGURE YOUR PC** WoL works for systems that are switched off or sleeping, which can help save power. You can easily adjust the sleep settings by opening the Start menu, typing **Power Options**, and pressing Enter. Click the "Change plan settings" link for the selected plan and this will enable you to choose how long the PC must remain idle before switching into sleep mode.

» Sometimes you might want your system to go to sleep straight away. That's pretty easy to do by going to Start, clicking the Shutdown arrow, and selecting Sleep, but you can also create a desktop shortcut. To make one, right-click a blank area of the desktop, select New > Shortcut and type **rundll32.exe PowrProf.dll, SetSuspendState** **(image D)**. Give it a name like "Sleep" and click OK.



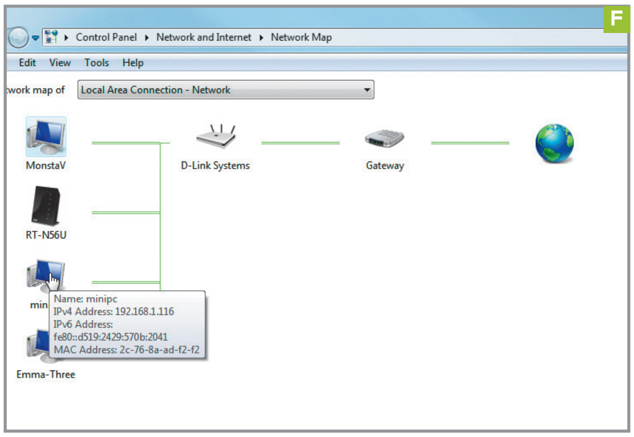
4 **WAKE YOUR PC** Using another PC on your home network, you'll need a bit of software to send the magic wake-up call. Try Depicus WOL (bit.ly/2N5DS6). Download and install it, and enter the IP and Physical Address (MAC) details you noted earlier **(image E)**. Then enter 255.255.255.0 for the Subnet and select Local Subnet from Options. Click "Wake me up" and the computer should spring back to life.

» Most mobile platforms have a wide selection of Wake on LAN (or WoL) tools available to them. Indeed, Depicus offers its own apps, so if you have an Apple iOS device, Windows Phone, or Android phone or tablet then you just need to download an app and enter the same details as in the last step. Make sure you're connected to your Wi-Fi, and you're done!



5 **TROUBLESHOOT PROBLEMS** If you're having difficulty getting this to work, there are a couple of things you can check. Both systems have to be on the same network **(image F)**, whether wired or wireless, as long as the two are connected. Secondly, within the adapter's properties in Step 4, double check for mentions of a magic packet in any WoL setting, which needs to be switched on.

» Congratulations, you now have a system that can be awakened from its low-power slumber or off state, remotely and from almost any device that will connect to your network, including tablets and smartphones. This is going to help you save power, time, and effort, and should generally help make life easier when it comes to managing and running a home network.



Manage Your Google Docs Offline with gExplore

YOU'LL NEED THIS

A GOOGLE DOCS ACCOUNT
Google Docs is a great tool for keeping all your documents, spreadsheets, and presentations in the cloud.

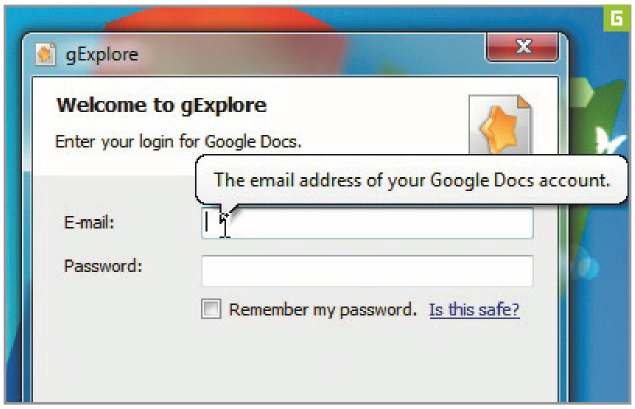
GEXPLORE
Keep your Google Docs organized with gExplore, available at www.mtnfog.com/gexplore. The free trial of the program is fully functional but the number of files you can organize is limited. The full version is only $10.

GEXPLORE IS a free program that enables you to upload and download files in your Google Docs account directly from Windows, and even send PDFs via email or to a Kindle. It shows all your documents in a folder interface that looks like a traditional Windows Explorer branch structure. It allows you to upload and download all document types supported by Google Docs, and you can encrypt files before sending.

You can also delete or rename documents, export entire collections to your computer, and view detailed file properties. Files can be searched by their name and contents, and you can create notes on each file to help organize and store additional information about them. Helpfully, notes can be stored in the cloud so you can access them from any PC with gExplore installed. –CHRISTIAN HALL

1 INSTALL GEXPLORE Browse to www.mtnfog.com/gexplore/index.aspx and click the Download link, which is beside the small green arrow icon on the left-hand side of the page. This downloads the free version of the gExplore software, which we'll be using here; a full version, available for $10, lets you organize more files and gives you added functionality such as Cloud File Notes.

» At the end of the installation process you'll be prompted to enter your Google account details **(image G)**. Check the box marked "Remember my password" and gExplore will save your login details so you're not asked for them every time you open the program. If you don't have a Google account, you must visit www.google.com and register there first.

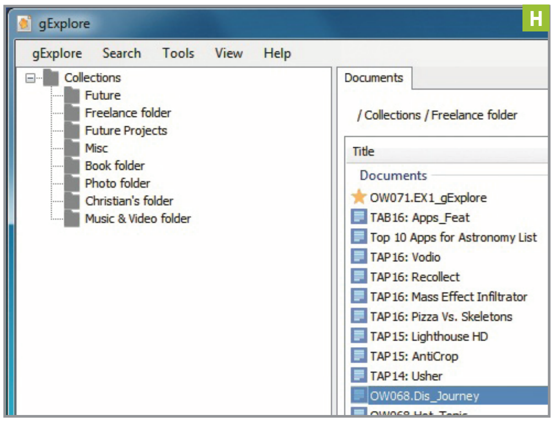


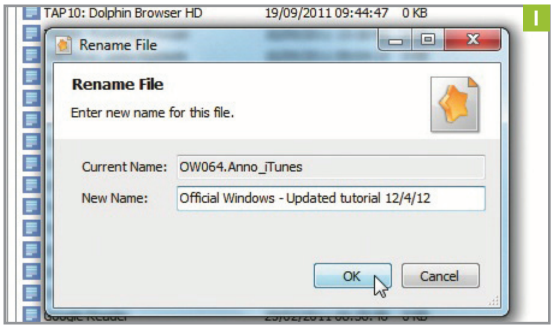
2 UPLOAD AND DOWNLOAD FILES gExplore is easy to use because it looks just like a normal Windows Explorer window, with a branch structure on the left showing your directories **(image H)**. Only folders that are found within your Collections folder on Google Docs are accessible. Right-click a file, and you'll see the various options for editing it, including adding a star to indicate an important document (Star File).

» If you've made some changes to a file on your PC and want to upload the more recent version to Google Docs, gExplore lets you do this by locating the document you want, right-clicking, and then choosing Upload New Version. As long as the filename is the same as the original file held in Google Docs, it will be overwritten in the same format as before.

» To download a document from gExplore to a location on your PC just choose it, right-click, and select Download. To upload you can either click an existing file, right-click, and choose Upload, or select Upload from the bottom toolbar. You can upload an individual file or a whole folder.

» Right-clicking a file will bring up options to rename or delete it. The Rename option brings up a new dialog box where you enter a new name under the old one **(image I)**. To verify any changes you've made in gExplore, or in Google Docs on the web, hit the Refresh button on the bottom toolbar.



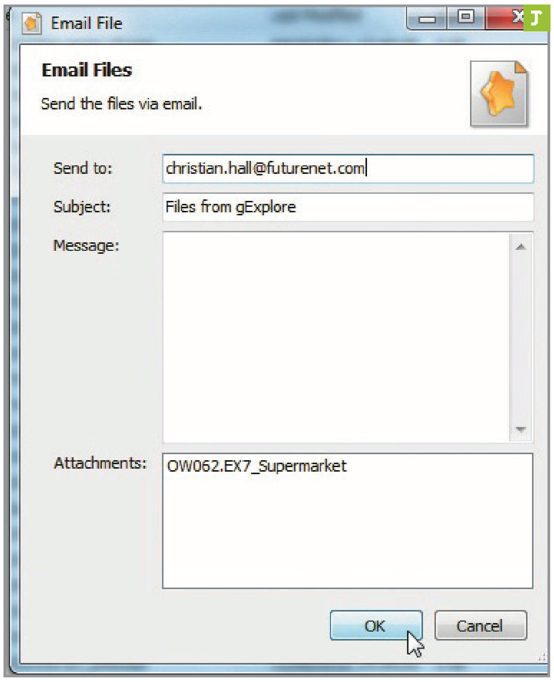


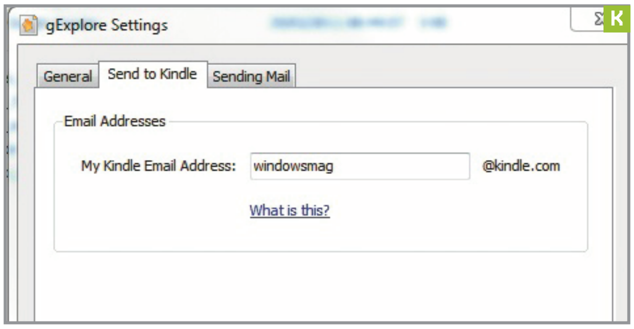
3 **SEND AND SHARE FILES** On the right-click context menu, click Email Selected Files to bring up a window where you can write the destination email address and a message **(image J)**. You can also highlight several documents and then choose the same Email Selected Files option. This is something you can't do in Google Docs!

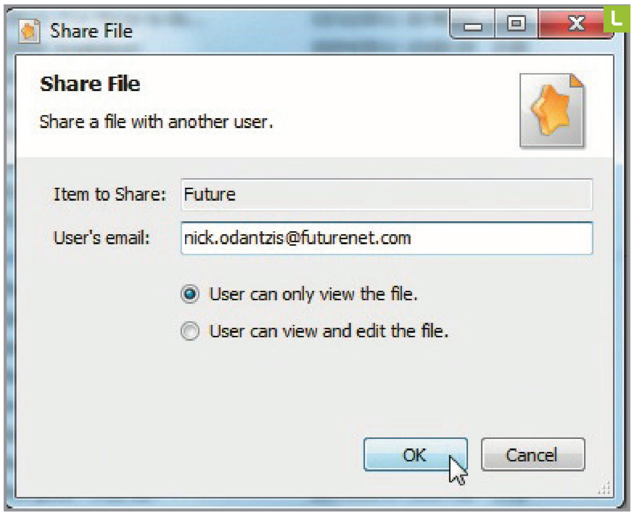
» In addition to email, you can send a document to an Amazon Kindle for reading. If this is a file type that a Kindle can read (PDF, TXT, and so on), the right-click context menu will show the option "Send to My Kindle." Click this to bring up a window where you can specify a Kindle email address to send the document to **(image K)**. Or you can send the file to an iOS or Android device that has the Kindle app installed.

» You can also share a Collection held in Google Docs with another user. Right-click a Collection in the left-hand branch structure, and there will be an option labeled Share Collection. Clicking this will bring up a window where you can enter the email address of the person you want to share with **(image L)** and what access they should have (View or Edit).

» Now you can manage all your Google Docs on the desktop and get away from the often-unreliable nature of working in the cloud. An extra feature in the full version of gExplore is Cloud File Notes. This enables you to store notes about a document without putting them in the document itself, which is useful when you collaborate or share files with other users.







BUILD IT

NATHAN EDWARDS **SENIOR EDITOR**

Rebuilding the Dream (Machine)

Our 2008 Dream Machine rises from the, well, not quite ashes

LENGTH OF TIME: **2 HOURS** | LEVEL OF DIFFICULTY: **INTERMEDIATE**

THE MISSION Our 2008 Dream Machine was a thing of beauty. We took the case from one of HP's ambitious-but-doomed Blackbird 002s, slathered it in chrome (because we could), and built a water-cooled monster, with two Core 2 Quad QX9775 CPUs, two ATI Radeon HD 4870 X2 GPUs, and a whopping 8GB of DDR2. To power it all we had PC Power & Cooling whip us up a custom 1,200W PSU. It was quite a machine in its day.

That was four years ago, though, and the parts we used are not only out of date, but out of sight. The only remnants of our once-great Dream Machine that we could excavate from the Lab were the case and the PSU. Not wanting such a beautiful case to go to waste, I decided to rehabilitate it as a companion piece to this year's Dream Machine. Aside from the chassis and PSU, I'm using all-new components, but they're much more modest in price and performance than the ones in this year's Dream Machine. In fact, if it weren't for the fact that the case (and chroming) once cost us a cool $6,000, this refurb would be just a hair above our Baseline configuration (see Blueprint, page 95).

The case was only available in one of HP's prebuilt Blackbird rigs, but the company did end up selling a few bare cases to anyone who could pony up $1,000. Unless you're one of the few who bought one, the case-centric parts of this build might not be directly relevant to you, so this is more of a build log than a how-to. The Blackbird wasn't an easy-to-use case when it came out, and users (like me) who are spoiled by modernity will have quite the ride trying to bring it up to date.

CHOOSING THE HARDWARE

SPEC'ING OUT this rig was harder than I thought it would be. Not only did I have to make a rig worthy of the over-the-top chassis (which I've dubbed the Chromebird), but I had to do so in a way that would complement, not distract from, this month's Dream Machine. Not easy to do in a chromed-out monster of a case.

Instead of building yet another Ivy Bridge or Sandy Bridge-E machine, I'm going with AMD's top chip, the FX-8150 Bulldozer. With eight cores, it's roughly comparable to an Intel Core i5-2500K on most highly threaded apps. Not the fastest chip out there, but perfectly capable of running a gaming and productivity workhorse. I'll run the Bulldozer CPU on an Asus Crossfire V Formula board, for both its brawn and its red-and-black color scheme. Prolimatech's Goliath cooler and two 14cm Vortex fans (red, of course) keep both the CPU and the motherboard cool, and the downward-facing right fan helps draw in air through the mesh side of the case. 2008's finest didn't have a lot of intake fans. For RAM, I'm using 16GB of Corsair Vengeance. With red heat spreaders, of course.

Keeping things in the AMD family, I'm opting for an XFX Radeon HD 7970 Black Edition. It's a fine, top-of-the-line graphics card with an attractive brushed-aluminum-and-red heatsink.

I'm keeping my standard 120GB boot SSD and 3TB storage drive combo, but in deference to the color scheme I'm opting for a Corsair Force GT. It's a fast SandForce-based 6Gb/s SATA drive, and yep, it's red.

The total bill for the retrofit (not counting the case or PSU) comes to just over $1,500. And that's with an eight-core CPU, speedy SSD, top-of-the-line GPU, scads of RAM, and plenty of storage. It's not a Dream Machine, but it's everything you need in a modern gaming PC. And it looks stellar.

BUILDING IN THE BIRD

The Blackbird 002 chassis was ahead of its time in many ways, so this build was a lot easier than it could have been. Unfortunately, not all the parts from the original survived, so I had to get creative in some places.

INGREDIENTS

	PART	URL	PRICE
Case	Custom HP Blackbird 002	bit.ly/mpcdm08	**$6,000 (in 2008)**
PSU	Custom PC Power & Cooling 1,200W	www.pcpower.com	**$530 (in 2008)**
Mobo	Asus Crossfire V Formula	www.asus.com	**$220**
CPU	AMD FX-8150	www.amd.com	**$200**
Cooler	Prolimatech Genesis, 14cm Vortex fans (x2)	www.prolimatech.com	**$105**
GPU	XFX Radeon HD 7970 Black Edition	www.xfxforce.com	**$500**
RAM	16GB Corsair Vengeance	www.corsair.com	**$85**
Optical Drive	Samsung SH-222AB CD/DVD burner	www.samsung.com	**$20**
SSD	120GB Corsair Force GT	www.corsair.com	**$130**
Hard Drive	3TB Seagate Barracuda	www.seagate.com	**$160**
OS	Windows 7 Professional 64-bit (OEM)	www.microsoft.com	**$139**
Total			**$1,559**

1 PREPARING THE BOARD

BECAUSE THE Genesis heatsink is so large, I didn't install it until the end of the build. But I did perform the rest of my usual motherboard preparation before I installed the motherboard into the case. First, I installed the CPU by lifting the socket arm, aligning the CPU with the socket, making sure it was oriented correctly, and then gently lowering it into the socket **(image A)**. Then I locked the socket arm back into place.

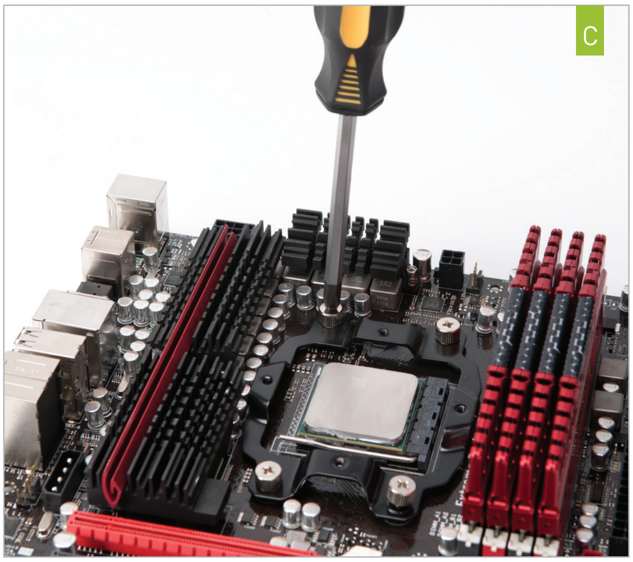
Next, I populated the RAM slots. I aligned each DIMM with its slot, making sure the notch on the RAM lined up with the one on the slot, then pressed each end of the DIMM until the clip locked into place. I repeated this with each DIMM **(image B)**.

A

B

2 INSTALLING THE COOLER MOUNT

THE GENESIS cooler doesn't use AMD's default mounting kit, though it does use the backplate. I removed the four screws securing the default mount and removed the two plastic end pieces. Then, using the four knurled thumbscrews, I attached the Genesis's AMD mounting plate to the stock backplate and tightened the screws in a cross pattern until all were secure **(image C)**.



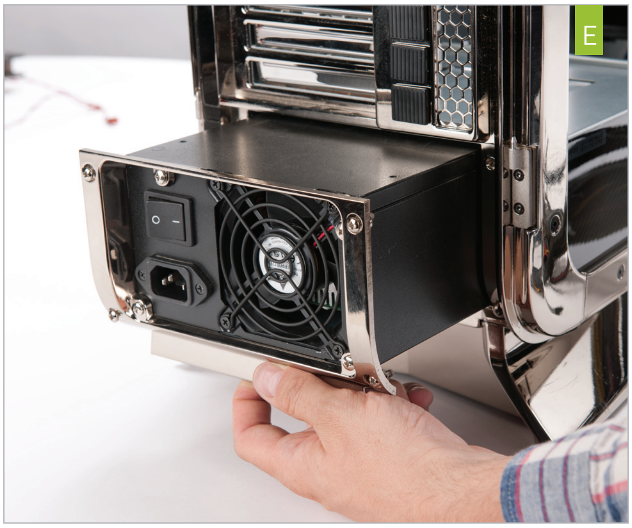
C

3 OPENING THE CASE

WITH THE motherboard prepped, it was time to open the case. The left side door has an easy-open latch, and once it's open more than about 45 degrees, lifts right off its hinges. The right door doesn't come off as easily. First I had to remove the decorative inset panel, and then unscrew the three screws securing the door to the rear of the motherboard tray (image D). After that, the door swung open and lifted from its hinges exactly like the left one.

4 INSTALLING THE PSU

THE STOCK Blackbird shipped with a modular PSU, but we had to have a special PSU made to power our dual-CPU, quad-GPU Dream Machine, and that PSU was, alas, nonmodular. To install it, I removed the PSU bracket from the bottom-rear of the case and attached the PSU to it (image E), then installed it into the case, pulling the cables through the PSU cover and out of the chassis.

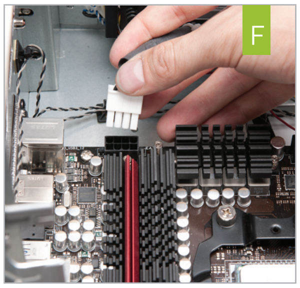


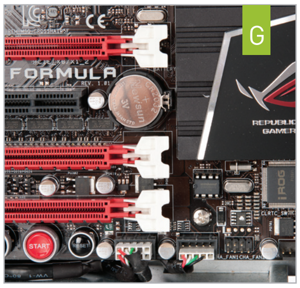
5 INSTALLING THE MOBO

ONCE THE PSU was in place it was time to install the motherboard. Since the case was last used for an EATX motherboard, I did have to move some standoffs into ATX configuration. I placed the case on its side and installed the I/O shield, then the motherboard. After returning the case to its upright position, I routed the 24-pin and 8-pin ATX motherboard power cables behind the motherboard to their connectors and marveled again at how forward-thinking the Blackbird's design was (image F).

While I was at it, I took the opportunity to connect the leads for the pop-out top panel connectors: HD_AUDIO, USB 2.0, and the multicard readers (image G). No front-panel USB 3.0 here, though the rear-panel ports still work. And though the top panel has a FireWire connector, the motherboard doesn't, so I hid the FireWire cable behind the motherboard tray.

I also connected the 12cm hard drive bay fan and front-panel connectors.

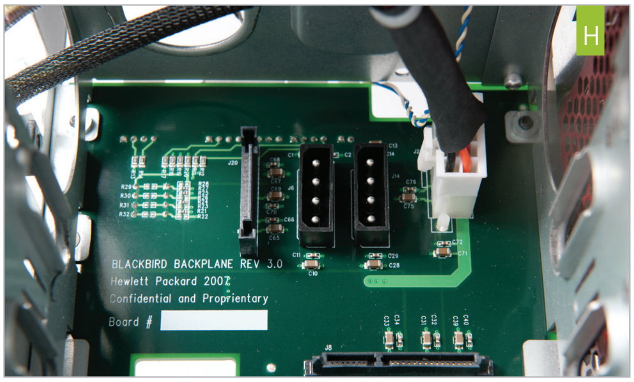




6 POWER TO THE DRIVES

THE BLACKBIRD came with a custom SATA backplane behind its five hotswap 3.5-inch drive bays, which can (in HP's infinite wisdom) be powered by one SATA power connector, two 4-pin Molex connectors, or one custom 10-pin power connector, which ain't exactly prevalent. Since the PSU we had built for the 2008 Dream Machine does have the 10-pin cable, I used that, and it was only later that I realized I could have used a less bulky modular power supply instead. Oh well! I routed the 10-pin cable above the hotswap bays and attached it to the backplane (image H).

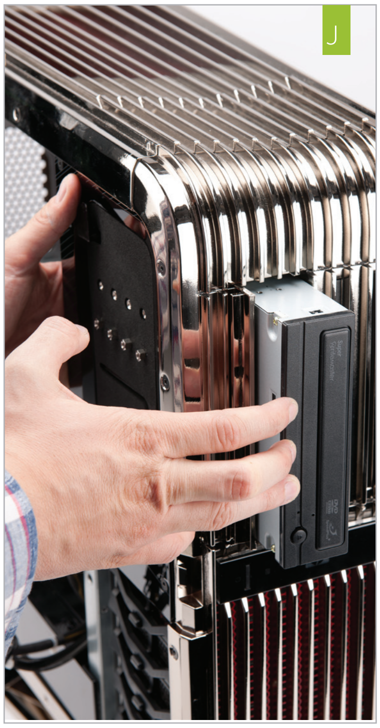
Since the backplane is just a pass-through and we've established that the age of your SATA cables doesn't matter (bit.ly/tY4rRm), it'll support 6Gb/s SATA drives—ideally.



7 AHEM. POWER TO THE DRIVES!

INSTALLING THE SEAGATE HDD went without a hitch. Unfortunately, since the hotswap drive trays were made in 2008ish, they lack support for 2.5-inch drives. The only 3.5-inch–to–2.5-inch adapter I had was one that Corsair shipped with my SSD, so I mounted the drive to it, stuck it in the tray, and slid it into the bay, where it completely failed to show up in the BIOS despite being seated and reseated. My guess is that since the rear of the tray wasn't held down by anything, it wasn't providing enough structure for the ports to line up. So I had to improvise. I mounted the drive onto its adapter tray and put it at the *rear* of the hotswap tray. I then attached a Molex-to-SATA adapter, because my PSU only had two SATA power plugs and they were too close together to power both the SSD and the optical drive. I connected a SATA cable to the motherboard, pulled it through the top of the drive area (next to the 10-pin power connector), and connected it to the SSD **(image I)**. I slid the tray back into the bay. Since I wasn't using the hotswap connector in that bay, I removed the SATA cable from the rear of the backplane and connected the other four SATA cables from the backplane into the motherboard.

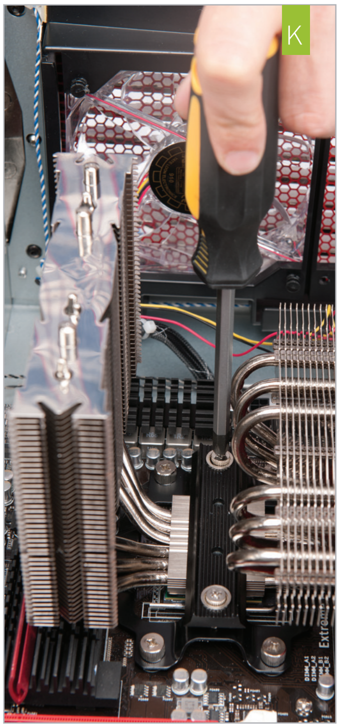
8 HITTING THE OPTIC NERVE



I ATTACHED ONE of the Blackbird's drive rails to the right-hand side of the optical drive, then slid the drive in from the front until its bezel was flush with the bay and the optical bay cover was able to close **(image J)**. I then attached a SATA cable and another SATA-to-Molex power adapter and slid the drive retention clip closed.

The Blackbird shipped with up to two slimline slot-fed optical drives, but the trays were designed for PATA drives and have little panels that completely block the area where a SATA drive would connect. So I'm leaving those empty for now. In the 2008 Dream Machine, we put a water-cooling radiator in there.

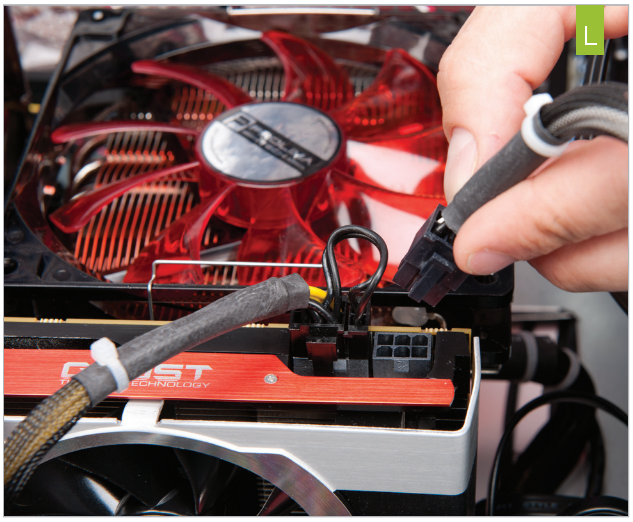
9 COOL IT!



WITH THE DRIVES installed and powered, I once again placed the Blackbird on its side, this time to mount the cooler. After applying thermal paste, I gently placed the cooler onto the CPU, with the horizontal fin stack over the RAM **(image K)**. I placed the crossbar over the heat exchanger and mounted it to the bracket with the two included spring screws (making sure to use the AMD-specific ones). Then I attached the two 14cm fans, one to each set of fins. I set the fan on the right-hand side to blow down toward the motherboard, and the one on the left to push cool air through the left-hand fin stack and out the rear of the case. This is especially important, as I've lost whatever mounting bracket originally enabled us to attach a 12cm exhaust fan to the rear of the case. I plugged the fans into the CPU FAN and CPU OPT FAN headers at the top of the board.

10 MOUNTING THE VIDEOCARD

LAST BUT not least: I mounted the videocard into the top x16 PCIe slot on the motherboard and attached an 8- and a 6-pin power connector **(image L)**. I then bundled up all the rest of the power cables and hid them behind the cover the Blackbird provides for this purpose. Then I double-checked all my wiring and connections, closed the case, and powered up my rehabilitated Dream Machine!



1. Even after four years and a chrome dip, the Blackbird chassis manages to look classy.

2. The Genesis cooler's weird design helps with overall airflow in a case without many intake fans.

3. Most of the Blackbird's thermal chamber dividers don't work with our new GPU and cooler, but the PSU cable cover still fits, for which we're grateful.

I KNOW WHY THE CHROMEBIRD SINGS

NOT GONNA LIE: The new build looks great. It's certainly one of the prettiest machines I've built to date. Can it compete with our 2012 Dream Machine? Not even a little bit. My rehabilitated Blackbird is a whopping 81 percent slower in Premiere Pro, 54 percent slower in Stitch.Efx, 18 percent slower in ProShow Producer, 47 percent slower in x264 encoding, and 62 percent slower in Batman: Arkham City. That sounds pretty bad until you realize that the 2012 Dream Machine has an eight-core Xeon and the equivalent of four GTX 680s and costs $10,000. So it's over six times more expensive than the Chromebird (again, not counting the case or PSU), but it's not six times faster. That's cost savings there.

Against our $2,500 zero-point machine, the Chromebird fares a little better. The zero-point has a six-core Sandy Bridge-E chip with Hyper-Threading, and its 12 threads absolutely crush the eight I get from my FX-8150, even at 3.8GHz. In the heavily multithreaded Premiere Pro, the zero-point was over four times faster, while in ProShow Producer, the Chromebird was only 24 percent slower. Stitch.Efx is one-third single-threaded and two-thirds multithreaded, and the Chromebird couldn't come close to our zero-point there.

So am I surprised or appalled that a $1,500 Bulldozer build can't beat a rig that costs a thousand dollars more? Nope. Instead, I'm happy that I built what I set out to build: a kick-ass gaming rig that looks amazing and performs well for the price, and a chance for the case from one of our old Dream Machines to live again.

If I had to do it over, I'd opt for a modular power supply and a 3.5-inch–to–2.5-inch drive bay adapter that'd let me use the SATA backplane for the SSD. Blackbird owners' forums indicate that Icy Dock makes one that works. But I'm happy with the Chromebird as it is, and glad I got a chance to make something beautiful that wasn't quite as much work as water-cooling this year's Dream Machine. This was almost a vacation in comparison.

BENCHMARKS

	ZERO POINT	
Premiere Pro CS6 (sec)	2,000	8,965 (-78)
Stitch.Efx 2.0 (sec)	831	1,923 (-57)
ProShow Producer 5.0 (sec)	1,446	1,893 (-24)
x264 HD 5.0 (fps)	21.1	13.4 (-36)
Batman: Arkham City (fps)	76	48 (-37)
3DMark 11	X5,847	X2,916 (-50)

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Our current desktop test bed consists of a hexa-core 3.2GHz Core i7-3930K 3.8GHz, 8GB of Corsair DDR3/1600, on an Asus Sabertooth X79 motherboard. We are running a GeForce GTX 690, an OCZ Vertex 3 SSD, and 64-bit Windows 7 Professional.

REVIEWS

TESTED. REVIEWED. VERDICTIZED.

INSIDE

74 Falcon Northwest Tiki

76 BenQ XL2420T monitor

78 Origin Eon11-S gaming notebook

80 Kingston 64GB Wi-Drive

81 Thermalright Silver Arrow SB-E cooler

82 Audioengine A5+ powered speakers

84 Samsung Galaxy S III Android phone

86 Dropcam HD

87 Razer Tiamat 7.1 gaming headset

88 Max Payne 3

90 Lab Notes

FALCON NORTHWEST TIKI PAGE 74

Falcon Northwest Tiki

Size really doesn't matter

SIZE DOESN'T MATTER. At least that's what Falcon Northwest is saying with its latest entry into the micro-tower war, the Tiki, which offers full-size tower performance in a teeny, tiny case.

In case you don't know, the micro-tower war is the place to be right now. Traditionally, slim micro-towers (as opposed to the typical Shuttle-style shoebox form factors) have been bereft of performance. That all changed earlier this year when Alienware hit the market with its X51 (reviewed in May). Just bigger than a typical first-generation console, the X51's innovation was a desktop-class GPU and CPU for a decent price. While groundbreaking, the X51 made some compromises, such as forcing you to choose between a hard drive or SSD, and offering only midrange GPU options (currently) and no ability to overclock.

The Tiki makes no such compromises, as one peep at the spec sheet makes clear. The Tiki we received packs a 3.5GHz Core i7-3770K overclocked to 4.2GHz, two 512GB Crucial M4 SSDs in RAID 0, a 3TB HDD, and a powerhouse GeForce GTX 680 card.

So how does the Tiki perform? Compared to our newly minted zero-point reference system, it takes a back seat. As good as Ivy Bridge is, a quad-core can't beat a hexa-core in multithreaded tasks: The Tiki gets punched in its petite nose in our Premiere Pro CS6 test, as well as in the x264 HD 5.0 runs. A single GeForce GTX 680 can't touch the GeForce GTX 690 in our zero-point, either. But it's not a total loss. The efficiency of the newer 22nm Ivy Bridge cores comes through in our Stitch.Efx 2.0 and ProShow Producer 5.0 benchmarks, which can't exploit all the threads in a hexa-core.

More important, though, is how well the Tiki does against the X51. We ran our older benchmark suite to find out, and it wasn't pretty. The Tiki crushed the X51 in all of our performance tests by double digits, and in one—Stalker: CoP—by triple digits. The Alienware X51 hit back in a very important benchmark, though: Wallet Mark 2012. Though far slower in most benchmarks, the X51 weighs in at $950. The Tiki reviewed here tilts the scales at $4,126. Falcon defends its price and says the config you see here was picked to show off the full-tower capabilities of the micro-tower. The company points out that the Tiki can be had in basic configurations for $1,700, but if you want fangs-out performance (and cost) you can get that, too. Plus, company officials say, the Tiki is aluminum and steel rather than plastic and steel and comes complete with that cool-looking polished granite stand.

The heavy stand, by the way, is designed to keep the Tiki from tipping over, which can happen when systems get this thin. Unfortunately, the stand and the airflow of the unit also mean it can't be run in a horizontal position, which is one of the most pleasing aspects of the X51.

We were also quite keen on the X51's support for Nvidia's Optimus technology, which seamlessly switches between the integrated and discrete graphics. Only Alienware has that power-saving feature today. In the Tiki's defense, though, the power efficiency of Nvidia's magical GeForce GTX 680 lets the Falcon sip just 65 watts at idle, which isn't that far from the X51's 50 watts at idle.

Yes, the Tiki wins on a lot of fronts, but we honestly don't think the machine takes out its intended target. The X51's price is mighty enticing, and the fact that it slides horizontally into a media center cabinet makes it fairly unique. Still, we have to give the Tiki props—it's the fastest tiny machine we've ever tested. –**GORDON MAH UNG**

VERDICT **9** KICK ASS!

Falcon Northwest Tiki

+ BATTLESHIP THE GAME
No-compromises performance in a micro-tower.

– BATTLESHIP THE MOVIE
Doesn't lay flat; very pricey.

$4,126, www.falcon-nw.com

SPECIFICATIONS

CPU	Intel 3.5GHz Core i7-3770K @ 4.2GHz
Mobo	Asus P8Z77-I Deluxe
RAM	16GB DDR3/1866
Videocard	GeForce GTX 680
Soundcard	Onboard
Storage	Two 512MB Crucial M4 SSD, 3TB Western Digital Caviar Green HDD
Optical	Optiarc BC-5650H Blu-ray combo drive
Case / PSU	Custom / 450-watt power brick

BENCHMARKS

	ZERO POINT	
Premiere Pro CS6 (sec)	2,000	2,639 (-24%)
Stitch.Efx 2.0 (sec)	831	804
ProShow Producer 5.0 (sec)	1,446	1,370
x264 HD 5.0 (fps)	21.1	16.4 (-22%)
Batman: Arkham City (fps)	76.0	41.0 (-46%)
3DMark 11	X5,847	X3,207 (-45%)

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Our current desktop test bed consists of a hexa-core 3.2GHz Core i7-3930K @ 3.8GHz, 8GB of Corsair DDR3/1600, on an Asus Sabertooth X79 motherboard. We are running a GeForce GTX 690, an OCZ Vertex 3 SSD, and 64-bit Windows 7 Professional.

Given its superb performance, the Tiki deserves to be placed on a pedestal—luckily, it comes with one.

The first TN panel that really delivers? Yes.

BenQ XL2420T

Possibly the best 3D monitor you'll lay eyes on

WHEN IT COMES to PC monitors, there are two things we find tiresome. The first is novelty "gaming" monitors that are underpinned by cynical marketing tie-ins. The second is finding yet another TN panel under our noses.

Say hello, then, to the new BenQ XL2420T, brought to you by pro-gamers HeatoN and SpawN (apparently, now retired as "too old" at 24). And, yup, the BenQ XL2420T has a TN panel. Oh dear.

Fortunately, this monitor is much more than just another chintzy branding exercise with a cheap panel. For starters, it supports Nvidia's latest 3D Vision 2 technology—that means Lightboost is part of the mix, which essentially doubles the brightness. There's hope here after all.

The basic image quality kicked out by the 1920x1080 BenQ XL2420T is truly exceptional. With rich and vivid colors, good contrast, and relatively little evidence of color compression on any of the scales, it might just be the best TN panel we've ever tested.

The only truly significant shortcoming compared to IPS, PVA, and new-fangled PLS panels involves the vertical viewing angles, which are distinctly mediocre. Everything else is in pretty much the same ballpark. The pixel response is typically excellent, as you'd expect from a TN panel, and doesn't betray any obvious symptoms of overdrive, which is a big bonus.

If the image quality isn't quite spot on, the good news is that this is one monitor where adding tweaks is a true pleasure. The clever OSD that sits just above the Windows Taskbar and the soft-touch, backlit OSD controls are the best we've seen, period.

Likewise, the programmable, mouse-like S Switch allows you to quick-jump between three panel presets in an instant. The chassis and stand are quality items, too, and offer the full gamut of adjustments: tilt, rotate, swivel, and height.

Finally, there's the Nvidia 3D Vision 2 support. In the first instance, that means a 120Hz refresh, which is a good thing regardless of what you use the screen for. It even makes using the Windows desktop smoother and more responsive.

In 3D mode there's absolutely no doubt that Lightboost delivers the best-looking stereoscopic 3D visuals to date. The colors are rich and the contrast is huge. It's truly spectacular stuff. OK, it will still make your eyes/brain (delete as applicable) hurt, but this is as good as stereoscopic 3D currently gets.

With such a strong all-around performance, it's hard to find any flaws. However, in terms of image quality, the vertical viewing angles are clearly inferior to any IPS, PVA, or PLS monitor. It's also worth noting that you'll need to pick up an Nvidia 3D Vision pack, as it's not included in the price.

Those concerns aside, the BenQ XL2420T offers a super screen experience. If that isn't enough to tempt you, it's the best stereoscopic 3D monitor we know of, too, thanks to Nvidia 3D Vision 2 and Lightboost. **–JEREMY LAIRD**

VERDICT 9 KICK ASS!

BenQ XL2420T

+ **JAWS** Bright and colorful; excellent OSD.

− **JAWS 3D** Vertical viewing angles are TN bad.

$425, www.benq.com

SPECIFICATIONS

Panel	24-inch, TN, LED backlight
Native resolution	1920x1080
Pixel response	2ms (GtG)
Inputs	DVI, 2x HDMI, VGA
Mounting	VESA MIS-D 100

Origin Eon11-S

The little gaming notebook that could

ORIGIN PC'S EON11-S isn't the first 11.6-inch gaming notebook to come knocking—Alienware kicked off the category in 2010 with its small-but-mighty M11x. But times have changed since the M11x's debut, hardware and thermals have advanced, and thus Origin's Eon11-S is no less impressive an accomplishment. Packed into the 11.2x8.1x1.4-inch chassis are an Ivy Bridge Core i7-3720QM quad-core processor and a GeForce GT 650M GPU. They're joined by a 256GB SSD in the standard 2.5-inch trim and 8GB of DDR3/1333 RAM across two slot-driven SO-DIMMs. Incidentally, all the innards are accessible via a bottom panel that pops off with ease, making future upgrades possible.

At present, upgrades are hardly called for. The Eon11-S ran circles around our 16.6-inch zero-point gaming notebook in the content creation benchmarks, with gains of more than 60 percent. In gaming, the two were a little more closely matched, with the zero-point's GTX 460M having a slight, but measurable advantage. Nevertheless, the Eon11-S proved its gaming mettle, with scores of 43.6fps and 66fps in Far Cry 2 and Call of Duty 4, respectively. That was with a resolution of 1680x1050 on an external display (native is 1366x768). When we ran the more modern and graphically challenging STALKER: CoP at 16x10 res and the Ultra setting, the Eon11-S achieved a decent 22.9fps.

A more apt competitor for the Eon11-S might be Acer's Timeline M3 (reviewed July 2012)—a 15.6-inch gaming Ultrabook. The Eon11-S weighs less by almost a pound—that is until you account for the power bricks; then the two weigh nearly the same, so honking is the Eon11-S's PSU. In performance the distinctions are more clear-cut. From Premiere to ProShow to Photoshop and MainConcept, the Eon11-S's 2.6GHz quad-core CPU was like a schoolyard bully wailing on the Timeline M3's growth-stunted 1.7GHz dual-core. We're talking beatings of 100–156 percent. In games, where the M3's GT 640M takes over, the Eon11-S showed a more modest 15 percent advantage. Still, it's the obvious choice if a super-portable gaming notebook is what you're after.

Capable as it is, the wee Eon11-S is not without tradeoffs. While it has the same 1366x768 screen res as the Timeline M3, the Eon11-S's keyboard suffers some from the smaller footprint. The compressed layout can feel a little cramped, particularly for larger-handed folk. At least it doesn't have the shallow keypress and maddening touchpad of an Ultrabook. The Eon11-S can also get pretty hot when running full tilt. A sizable vent on the left side of the machine expels a rush of hot air that could rival a space heater. Finally, battery life isn't incredible. Three hours–plus is pretty decent for a standard-size gaming notebook, but it doesn't come close to the five hours achieved by the Timeline M3. But all of these issues are just what come with the territory when you cram serious hardware into a small form factor. What you get in return is powerful rig that's also amazingly portable, and we applaud OriginPC for filling that niche.

–KATHERINE STEVENSON

VERDICT 9 KICK ASS!

Origin Eon11-S

+ SHORTBREAD Lotta power, little package; upgrade friendly.

– SHORT BUS Small keyboard; gets hot; compact size offset by huge power brick.

$1,625, www.originpc.com

SPECIFICATIONS

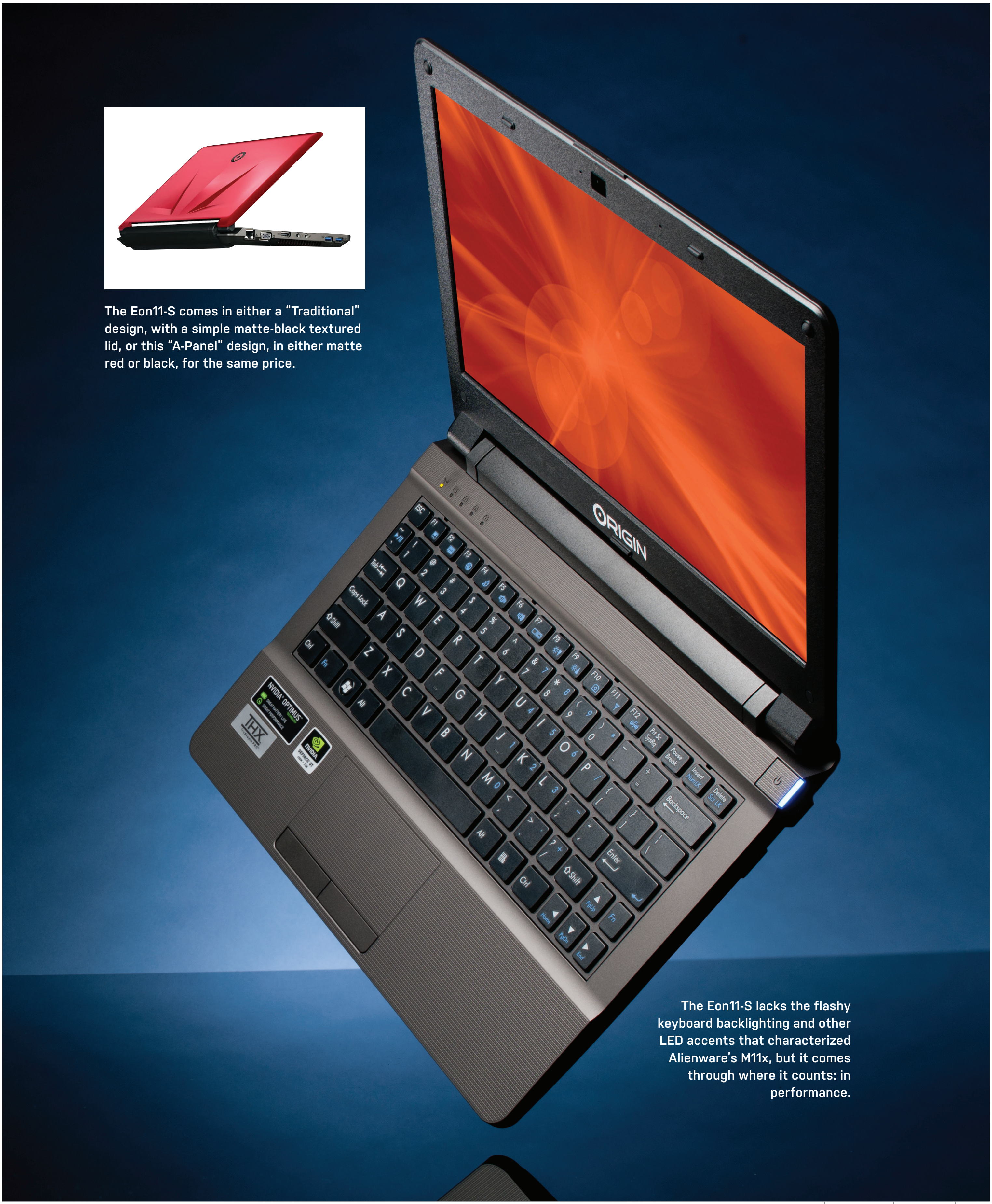
CPU	2.6GHz Intel Core-i7 3720QM
RAM	8GB DDR3/1333, dual-channel
Chipset	Intel HM65
GPU	Nvidia GeForce GT 650M w/ Optimus
Display	11.6-inch, 1366x768
Storage	Samsung 830 Series 256GB SSD
Connectivity	802.11n/g, Ethernet, VGA, HDMI, headphone, mic, 2x USB 3.0, powered USB 2.0, 1.3MP webcam, 9-in-1 media reader, Bluetooth 4.0
Lap / Carry	3 lbs, 11.3 oz / 5 lbs, 5.1 oz

BENCHMARKS

	ZERO POINT	
Premiere Pro CS3 (sec)	899	540
Photoshop CS3 (sec)	131	69
ProShow Producer (sec)	876	525
MainConcept (sec)	1,782	1,018
Far Cry 2 (fps)	48.5	43.6 (-10.1%)
Call of Duty 4 (fps)	62.2	66.0
Battery Life (min)	96	190

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Our zero-point notebook is an Asus G73Jw-A1 with a 1.73GHz Intel Core i7-740QM, 8GB DDR3/1066, two 500GB Seagate 7,200rpm hard drives, a GeForce GTX 460M, and Windows 7 Home Premium 64-bit. Far Cry 2 tested at 1680x1050 with 4x AA; Call of Duty tested at 1680x1050 with 4x AA and 4x anisotropic filtering.



The Eon11-S comes in either a "Traditional" design, with a simple matte-black textured lid, or this "A-Panel" design, in either matte red or black, for the same price.

The Eon11-S lacks the flashy keyboard backlighting and other LED accents that characterized Alienware's M11x, but it comes through where it counts: in performance.

The Wi-Drive works as a small, battery-powered media server.

Kingston 64GB Wi-Drive

Offload your bulk videos and music

THE CONCEPT FOR Kingston's 64GB Wi-Drive is a little difficult to communicate to most people, but we've decided the best analogy is real estate.

Pretend you live in Tokyo or Manhattan and your $850,000 condo is just 700 square feet. What do you do with all your crap? Get a storage unit.

That's precisely how Kingston's clever little Wi-Drive works. Coming in sizes of 16GB, 32GB, and 64GB, the Wi-Drive lets you offload video, images, and music onto a diminutive battery-powered device. To access the files, you simply connect your smartphone, tablet, or laptop to the Wi-Drive via Wi-Fi. Even better, the Wi-Drive allows up to three simultaneous users so it essentially operates as a personal media server. For storage-limited devices such as the Kindle Fire or small-capacity iPads, the Wi-Drive lets you live large with media.

We found the device's range to be pretty fair. It's ample enough to let you watch videos stored on it while your friend or family member also watches from their seat 10 rows behind you on the plane. Adding files is as simple as plugging the device into your PC, where it's recognized as a USB mass storage device.

On your Android or iOS device, you need to install a small client available from each platform's application store. On Android units, the app lets you pick your media player of choice, so we had no problems consuming the different video formats; iOS was pickier.

In places where you have Wi-Fi, you can configure the Wi-Drive to work as an access point, too. It supports WEP, WPA, and WPA2 on 802.11g/n. For the security-conscious folks, you'll want to enable encryption. By default, the device runs wide open, which could be quite embarrassing, as anyone on your flight could connect to and view your files. So unless you're Kim Kardashian, you should probably lock down the device.

The Wi-Drive is almost too easy to use, but we did have a couple of issues, such as the use of a Mini USB charger. What is this, freaking 2008? Getting it to run on external power is also tricky. You can't turn on the unit when it's plugged into a charger. What you have to do is unplug it, turn it on, and then plug it back into the charger. Unplugging the charger also kicks off power, oddly. As is, the unit will give you about three to four hours of streaming before the onboard battery goes. We think that's short, but honestly, most of the devices you'll be using to watch the videos will probably be dead, too.

As we mentioned, we're also confused by the use of a Mini USB port instead of Micro USB.

These are fairly tiny annoyances, though, in what is otherwise a pretty solid product. What could make it better? Perhaps a microSD slot to add additional storage and a heftier battery pack for longer flights. It would also be cool to be able to drop videos on the unit once it's been mounted on your network, but that's probably making it far too complicated. As is, the Wi-Drive works pretty damn well.
–GORDON MAH UNG

VERDICT 9 **Kingston 64GB Wi-Drive**

+ **GUMBALL RALLY** Easy to set up and simple to use.

− **THE CANNONBALL RUN** Can't power up when plugged into charger.

$150, www.kingston.com

Thermalright Silver Arrow SB-E

Close, but no silver bullet

SPECIFICATIONS

Dimensions H x D x W (inches, with fans)	6.6 x 5.1 x 6.8
Weight	2 lbs, 7.6 oz
Heat Pipes	8
Stock Fans	1x 15cm, 1x 14cm, PWM
Add'l Fan Support	1 (wire clips included)

THE THERMALRIGHT Silver Arrow SB-E doesn't lack for heat pipes: Eight of them rise from the heat exchanger up into the two sets of cooling fins. The entire thing, from aluminum fins to copper pipes and heat exchanger, is plated in a shiny nickel coat. The two sets of cooling fins are shiny and jagged, and much more stylized than the Noctua DH-14 (reviewed April 2012) or the Phanteks PH-TC14PE (reviewed June 2012), its most obvious competitors of the coolers we've tested. The whole assemblage weighs two pounds, 7.6 ounces with both fans. Those fans—a 15cm TY-150 and 14cm TY-141—are both low-RPM 12V fans with 4-pin PWM connectors.

The Silver Arrow includes mounting hardware for Intel LGA775, 1366, 1156, 1155, and 2011, as well as AMD FM1, AM2, AM2+, AM3, and AM3+. Unfortunately, all the mounting brackets are finicky and complicated. The anchor plate attaches to mounting posts—either mounted through to the backplate or (on LGA2011) mounted directly to the integrated backplate—with the use of tiny Philips-head screws. Then the mounting plate goes over the back of the heat exchanger and attaches to the anchor plate with two *more* tiny screws. The mounting plate doesn't secure to the heatsink, so it slides around while you try to line up the screws. The fin stacks are close enough together that all but the longest, skinniest screwdrivers are too wide to fit between them. The fans attach to the cooler with wire clips, which are flimsy and difficult to secure compared to the much better clips found in the Phanteks and Noctua coolers. Like most dual-stack coolers we've tested, the Silver Arrow interferes with tall RAM heat spreaders, so you'll need to use low-profile RAM.

Once installed onto our overclocked i7-3930K test bed, the Silver Arrow SB-E performed slightly behind the Noctua and a good 3 C behind the Phanteks. It was even slightly outperformed by the direct-contact Cooler Master Hyper 212 Evo. For the price of the Silver Arrow you can get the Noctua, which has an easier install and slightly better temperatures, or for $5 more you can get the Phanteks, which performs even *better,* has a better install than the Thermalright, and comes in a variety of colors, but lacks PWM fans.

—NATHAN EDWARDS

VERDICT 7

Thermalright Silver Arrow SB-E

+ GREEN ARROW Good, but not best-in-class cooling, quiet; PWM fans.

– GREEN HORNET Frustrating install; requires low-profile RAM.

$85, www.thermalright.com

BENCHMARKS

	Thermalright Silver Arrow SB-E	Noctua NH-D14 SE2011	Phanteks PH-TC14PE
Ambient Air	23.1	23.1	21.6
Idle Temperature	32.2	31.3	**30**
Burn Temperature	69.5	68	**64.8**
ΔT (Burn-Ambient)	46.4	45.7	**43.2**

All temperatures in degrees Celsius. Best scores bolded. All tests performed using an Intel Core i7-3960X at 4.2GHz, on an Asus Sabertooth X79 motherboard with 16GB DDR3/1600, in a Thermaltake Level 10 GT with stock fans set to Low.

There's something incongruous about mustard-and-olive fans with those edgy nickel-plated cooling fins.

The retro white finish on Audioengine's A5+ self-powered speakers is totally groovy, man.

Audioengine A5+ Powered Speakers

Great speakers made even better

WOW. HOW DID FIVE years go by so quickly? We first became aware of Audioengine in early 2007, when the company asked if we'd be interested in evaluating its A5 self-powered speakers. It's now 2012, and we have the revamped A5+ self-powered speakers on our desk. Now, as then, we're knocked out by the huge sound these monitors can produce.

The changes from the original A5 aren't significant, but they didn't need to be for these speakers to sound great. Slotted vents have replaced the rear bass ports. The 1/8-inch audio input and the USB port for charging a smartphone, iPod, or other digital media player have both been moved from the top of the cabinet to the back of the enclosure. The aux AC outlet has been nixed, but the second 1/8-inch input has been replaced by a pair of stereo RCA inputs. The RCA line-outs and five-way binding posts for connecting the left and right channels have been carried over, but the line-outs are now variable where the output level on the original A5 was fixed.

Audioengine's engineers have added a large heatsink to help cool the dual Class AB monolithic amplifiers inside the left cabinet, which now draw power from a toroidal power transformer (valued for its ability to reject electromagnetic interference). As with the A5, the A5+ produces a superbly clean 50 watts per channel, with claimed total harmonic distortion of just 0.5 percent and an A-weighted signal-to-noise ratio greater than 95dB. The drivers themselves are either the same as what was used in the original A5 or something very close, with 5-inch Kevlar woofers accompanied by 0.79-inch silk dome tweeters.

The A5+ cabinets are made from 1-inch-thick MDF and measure 10-inches high, 7-inches wide, and 7.75-inches deep, and there's a standard 1/4-inch screw mount in the bottom of each enclosure to accommodate floor stands. There's a volume control on the front of the left speaker, and Audioengine provides a simple IR remote for controlling or muting the volume control as well as putting the speaker into a sleep mode when it's not being used (so you don't have to reach around the back of the cabinet to flip the power switch).

Reaching back into our music library, we listened to the groundbreaking Dire Straits album *Lover Over Gold* that we had ripped from a CD and encoded in FLAC. "It Never Rains" opens with a happy-go-lucky synth line, which is soon joined by bass and drums. As layers of piano, electric guitar, Hammond organ, and vocals were gradually layered on top, the speakers never lost the ability to render the drummer's rim shots with crystal clarity. This track starts out very quiet and builds to an incredible climax with the synth, piano, and guitar trading licks while the rhythm section relentlessly pushes the song forward. We're never ready for it to end, and it seems the band isn't either, because the track ends in a long fade. We had an equally exciting experience with games: The A5+ delivers tight, gut-punching bass response as we played Max Payne 3, even without a subwoofer (although Audioengine now offers one that you can add to the mix). You'll need plenty of room atop your desk to accommodate these speakers, but they're perfect for power users.
–MICHAEL BROWN

VERDICT 9 KICK ASS!

Audioengine A5+

+ SILK DOME Superb sound; great convenience features.

– TEAPOT DOME Large cabinets take up a lot of desktop space.

$400, www.audioengineusa.com

Samsung Galaxy S III

There's good reason for all the hubbub

WITH THE LATEST version of Android, a whopping 4.8-inch Super AMOLED HD screen, and a whole suite of Apple-beating features, is the new Samsung Galaxy S III the greatest phone ever?

The large device (5.37x2.77x.33 inches) is adorned with brushed polycarbonate—offered in "Marble White" or "Pebble Blue." The plastic feel of the Galaxy S III won't appeal to everyone; it feels very lightweight in the hand, despite tipping the scales at 4.69 ounces. But we'll be clear on this: The Galaxy S III is not a cheap-feeling phone. It's got a really solid Gorilla Glass 2 front, a well-packaged interior, and a robust battery cover.

The button design seems well thought out, with the lock button on the right-hand side, a lozenge-shaped home button up front, and softkey "Back" and "Menu" buttons. The volume button is parallel to the lock key on the left-hand side of the phone, and both are within easy reach when holding the S III in hand. A MicroUSB port resides at the bottom of the phone.

Beneath the battery cover on the back, you'll find not only a removable battery, but a microSD slot for expansion, making it possible to grow beyond the 16GB–32GB of internal storage.

The S III's 1280x720 screen is beautiful. Its large size, contrast ratio, and excellent color reproduction will definitely wow users. The 309ppi density is up there with the sharpness of the iPhone 4S, but its 4.8-inch expanse makes the 4S's 3.5 inches seem puny.

Samsung has unsurprisingly re-tooled the TouchWiz overlay for the Galaxy S III and there's a definite sense the whole process has been simplified, as the phone has a much easier feel to it when swiping around. That's not to say there aren't loads of widgets to be played with, but there's less clutter on the screen. The dock at the bottom of the display holds five favorite items.

There's been much hay made about the CPU switch in the S III. The international version gets Samsung's own quad-core 1.4GHz Exynos 4 proc, but due to a lack of LTE support, U.S. versions of the S III get dual-core 1.5GHz Qualcomm Snapdragon S4 chips instead. Does it make a difference? As with a PC, it's not just about the core count and clocks, but also the underlying instruction set it's based on. Besides being a respectable chip, the S4 also integrates the modem, GPS, and an Andreno 225 GPU. Basically, it's no slouch despite sporting two fewer cores. Even better for Android users may be the extra RAM. While the international S III is saddled with 1GB of RAM, the U.S. versions get 2GB of dual-channel low-powered DDR.

In terms of management options, there are more than ever before—the battery usage meter is joined by the data management tool that allows you to see which apps are sucking down the most bytes.

Another big feature for the S III is the addition of motion control—not necessarily a new idea, but one that's been pushed to a whole new level in the phone. Not only can you mute a call by turning the phone over or placing your hand over it, but you can also perform the same trick when playing music.

Voice recognition is available via S Voice. It's based on Vlingo and does pretty much everything that Siri on the iPhone can do—it even parses WolframAlpha to get its information. It's most effective at simple tasks, such as opening the calendar, making an appointment, or playing a specific song or playlist.

Phone calls on the S III couldn't be better. Sure, it's a relatively simple function in today's smartphones, but it's still often overlooked. In our noise tests, the S III came out on top in terms of calling the same person with traffic and wind behind us. Signal quality seemed to be average—we didn't notice any significant drops, but in the areas where we've had a notoriously poor signal before (on the 3G network) there weren't any more bars available to us. Still, given that dropped calls were very rare, we can't label this as a negative.

Then there's T9 dialing—again, nothing special but we really miss it when competing phones like the iPhone or those in the Windows stable don't allow it. Simply pressing the numbers will call up the corresponding letters, making tapping 323 the easiest way to get to "Dad." Video calling is also well-integrated, with those on a similarly-enabled phone quickly picking up our facial features, even over 3G.

When it comes to the Internet, there's no reason to think that a phone with a dual-core chip, HD screen, and powerful GPU shouldn't provide a stellar Internet experience, and the Samsung Galaxy S III doesn't disappoint. The Chrome browser is now enabled on the S III, thanks to it coming with Ice Cream Sandwich, so this means synchronized bookmarks over a PC, tablet, and smartphone, provided you're signed into Google.

The camera on the Samsung Galaxy S III is one of the biggest surprises: It's stuck at 8MP. The humble mobile phone doesn't need any more than 8MP to take good-quality snaps, but Samsung has always chased specs in the past, so this is an interesting move. Overall, the speed with which you can take a picture, the options on offer, and the sheer range of settings for folks who want to dig a little bit

SPECIFICATIONS

OS	Android Ice Cream Sandwich 4.0
Processor	1.5GHz dual-core Snapdragon S4 CPU
Display	4.8-inch, 1920x720, AMOLED
Capacity	16GB-32GB storage plus microSD slot; 2GB system RAM
Cameras	1.9MP webcam front; 8MP rear
Video	1080p video capture
Connectivity	Bluetooth 4.0, 802.11b/g/n, GSM and/or LTE radio, Micro-USB, 3.5mm audio jack
Battery	Li-ion 2,100mAh
Dimensions	5.37x2.77x.33 inches, 4.69 oz.

deeper (contrast, exposure, ISO levels, and white balance tweaks will appeal to many) all combine to make a cracking camera that will be more than adequate for most. For video, the default is 1920x1080 at 30fps, but settings are pretty limited. The front-facing camera has a 1.9MP sensor and 720p video recording.

The S III's 2100mAh battery is designed to make sure the large screen, with millions of pixels, isn't going to suck down power too fast. We ran a 90-minute video at full brightness and applied all accounts (Dropbox, Facebook, Twitter, Exchange, etc.), setting them all to the most regular updates over Wi-Fi. The Samsung Galaxy S III managed to retain 82 percent battery power by the end of the test—compare that to the 60 percent on the HTC One X and 74 percent on the iPhone 4S and you can see why we're impressed. Under heavy load, the phone will last about eight hours. And we mean *heavy*: the battery test we mentioned plus an hour of photography and video. (Note: This test was conducted on an international S III).

With a host of new features, a spec list that's close to being unbeatable in the modern climate, and a pretty darn palatable price on contract (if you're with the right network), there's a good reason why the Galaxy S III broke pre-order records the world over. Samsung faced an almost impossible task in trying to create a worthy sequel to the Galaxy S II, but the Galaxy S III should definitely be one of, if not *the* phone you consider on your next trip to your local handset emporium. –**GARETH BEAVIS**

VERDICT 9 KICK ASS!

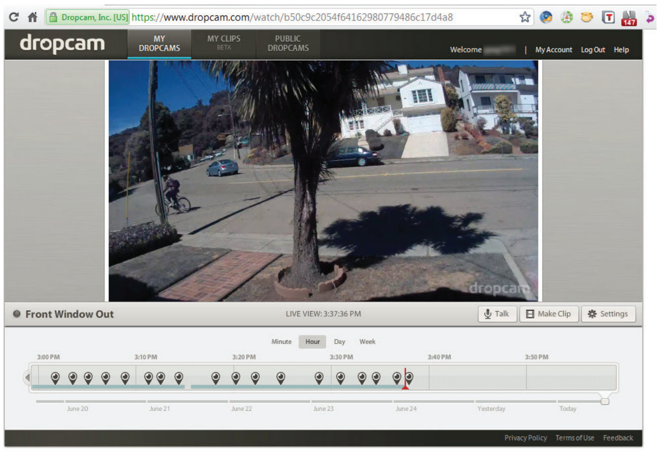
Samsung Galaxy S III

GALAXY Excellent battery life; superb screen; quad-core proc.

BLACK HOLE Plastic body won't win over everyone; S Voice is more gimmick than useful.

$620 for 16GB or $680 for 32GB (or subsidized based on plan; available through all carriers)

The weight of the large 4.8-inch screen and hefty 2,100mAh battery is offset by the S III's lightweight polycarbonate body and paper-thin removable back cover.



The Dropcam HD video is uploaded to Dropcam's server, where it can be stored for seven to 30 days—for a cost.

The Dropcam can be removed from the unique mount, if needed.

Dropcam HD

It doesn't get any easier than this

WHEN WE HEAR hype that something is the "easiest" thing in the world to set up, we usually put on our hip waders and prepare to slog through a waist-high pile of dung, because 19 times out of 20, it's usually a load of crap.

Well, believe us when we say that the Dropcam HD is the easiest Internet cam we've ever set up. We mean it. To set up the Dropcam HD, you just plug the camera into your PC via USB. The setup files are stored in flash, which kicks up a configuration utility. This lets you create an account with Dropcam and connect the device to a Wi-Fi network. Once you've done that, you unplug the Dropcam HD, move it to the area you want to monitor, and plug it in via the included 2-amp wall wart. That's it; you're done and streaming 720p video to the Internet in about two minutes flat. The lens is a wide 107 degrees, which is enough to let you see most of a room. The video quality is good, and while certainly far better than QVGA surveillance cams, the compression is heavy enough that you won't be picking out license plates with it.

The video is available anywhere you have a Flash-enabled browser, and the company offers free iOS and Android apps that work reasonably well. The Android version we looked at required installing Adobe AIR but it's fairly fully featured, allowing you to turn the cam on or off, flip various settings, and also review previous events recorded and stored in the cloud.

That's one of the strengths and weaknesses of the Dropcam HD. Unlike most surveillance cameras that stream directly to you or an always-on server in your home, all of the video from the Dropcam HD is fed to Dropcam's servers via an encrypted feed. By logging in, you can review seven to 30 days of footage. This is the part that doesn't come cheap. The free account gives you real-time access and nothing more. For Dropcam to "DVR" for up to seven days, it'll cost $9.95 a month or $99 a year. Dropcam can store up to 30 days of footage for $30 a month or $300 a year. The plan price is halved for each additional Dropcam.

That ain't cheap, even if the company is doing all the heavy lifting of storing and serving the data. Without a plan, you really can't do much. Even if you were watching the Dropcam HD when you caught your neighbor stealing your paper, there's no provision to take a snapshot or video clip without a DVR plan. This isn't a problem if all you want to do is create a public cam of your turtle in a terrarium, but as a surveillance device, it's a bit limited.

We will say that cloud storage makes the Dropcam HD far more responsive than other cams we've tried. Other cameras we've used take a minute or several minutes to connect from a phone. That may seem like nothing, but one or two minutes is an eternity when you have the alarm company on hold and they just told you the motion detector in your living room went off.

Another thing to consider is the amount of bandwidth consumed. The Dropcam HD is constantly streaming video to the Dropcam server at about 400Kb/s. The company estimates that if left on 24/7, the Dropcam HD would eat about 50GB of data.

All told, we're floored by the Dropcam's ease of use, and the device seems to have addressed every single weakness we've seen with other cameras—except for the limitations of the free plan. Perhaps a one-day or even 12-hour DVR plan is in order. –**GORDON MAH UNG**

VERDICT 9

Dropcam HD

+ **THE CONVERSATION** Easy as hell to set up; wide-angle lens; responsive mobile apps.

− **SPY GAME** Slightly pricey DVR plans; consumes a lot of bandwidth.

$150, www.dropcam.com

Razer Tiamat 7.1 Gaming Headset

Each earcup on the Tiamat 7.1 features five individual drivers, which are visible through the side windows.

Extreme headset pushes surround-sound envelope

WITH THE TIAMAT 7.1, Razer is redefining the top end of the gaming audio line. Where previous headsets have had trouble creating a surround gaming experience through just two drivers, the Tiamat fits what is essentially an entire surround sound system into each earcup, with five individual drivers, including a sub. You'll need a 5.1- or 7.1-capable analog sound subsystem with three outputs to take advantage of the surround (and at $180, the set's not worth it if you can't), but if you've got the hardware this is the new headset to beat.

The first thing you'll notice about the Tiamat 7.1 is that everything about it is big. The headband is big, the earcups are huge, and even the in-line control unit is about three times the standard size. When you hold it in your hands it's clear that Razer has chosen a no-compromises design, where comfort, convenience, and sound quality beat out economy and subtlety every time.

The earcups, for instance, are huge for two reasons. The first is for comfort—they feature some of the thickest padding we've felt, and are extremely comfortable. They have a cirmcumaural design (the padding goes around your ear, not on top of it), and although they're a little on the narrow side for that design, causing larger ears to bend in, they're quite comfortable and form a tight seal. Combined with the closed-cup design, this nicely enhances the immersion and noise-isolation of the set. The second reason they're big is to fit the five distinct, large drivers that reside in each cup. A clear plastic window on each side of the Tiamat shows those drivers off to the world, in case you want to count them for yourself.

The headband is also comfortable, with a suspension-type design and a thickly padded flexible band that we found comfortable for long play sessions—a significant feat, given that the Tiamat is on the heavier end of the headset spectrum.

The in-line control unit's another nice, no-compromises feature of the headset, with a heavy-duty mechanical knob that can be used to control the volume of the whole set, the mic, or any particular channel of the 7.1 sound. It also has mute, surround toggles, and an overall build quality that's exceptionally solid.

The sound quality on the Tiamat is top-notch when it comes to what the set is designed for: gaming. The five drivers in each earcup make for great sound with a ton of directionality. On the remote you can switch between 7.1 surround and stereo modes, and when you do so during a game the difference is like night and day—a frantic firefight goes from an unintelligible mass of noise to distinct sources of sound, all around you.

The bass is strong and punchy, thanks to the in-ear sub. When we got our set the bass wasn't working in surround mode, and we'd heard of other people having the same problem. But a trip to Razer's FAQ and some Windows sound configuration changes fixed the problem easily.

The Tiamat also worked well for watching movies on the PC, though of course to get the full benefit of the set you need a source with 7.1 or 5.1 surround audio. When it comes to music the set does a respectable job, although there's no getting around the fact that five small drivers simply isn't the ideal configuration for playing music.

All in all, it's clear that Razer took its time with this one. The Tiamat is one of the best all-around gaming headsets you can buy, if you've got the money and the soundcard. **–ALEX CASTLE**

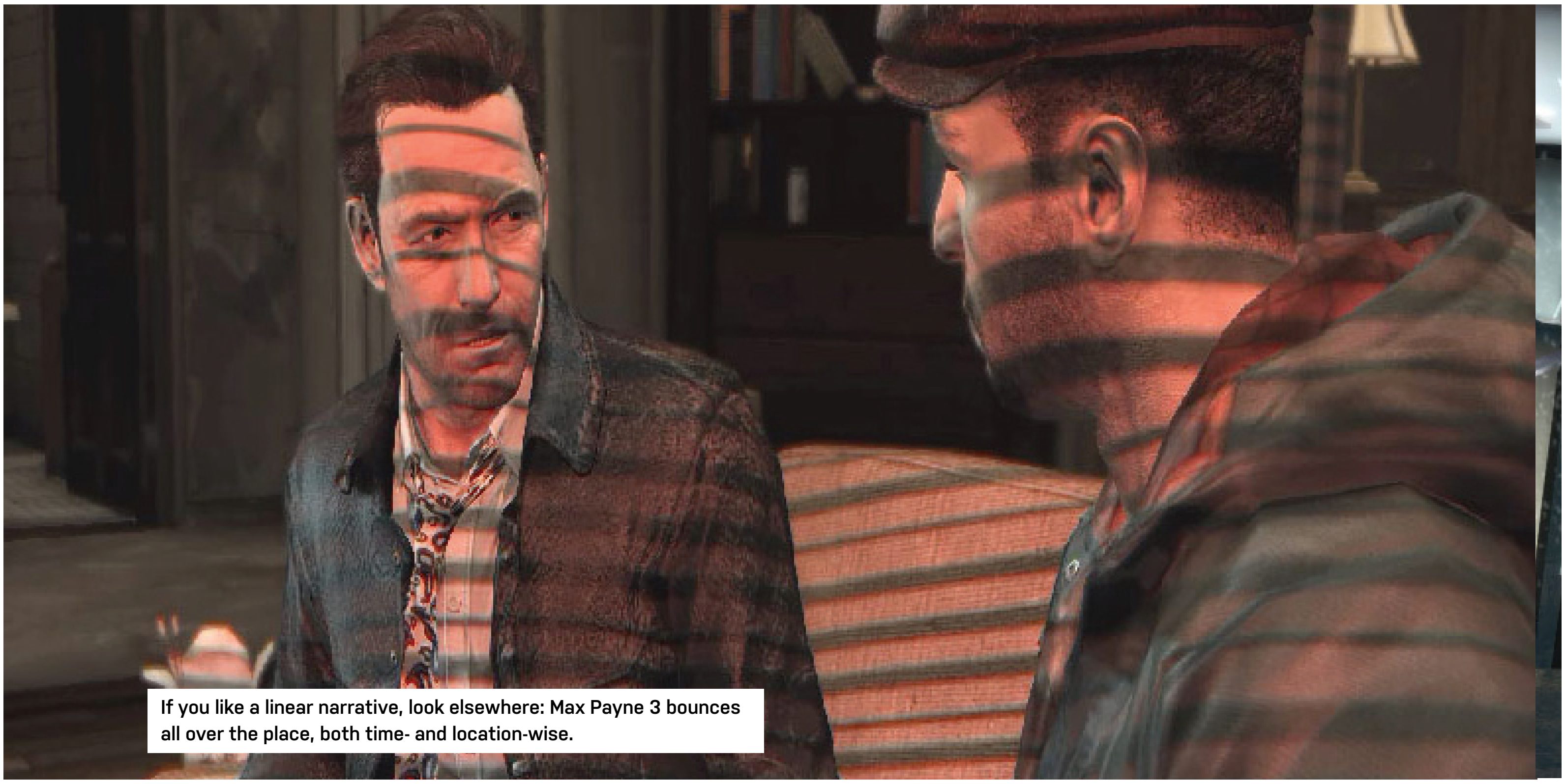
VERDICT 9 KICK ASS!

Razer Tiamat 7.1

+ TIAMAT Great surround sound; very powerful bass for a headset; excellent comfort.

– HAZMAT High price; somewhat bulky.

$180, www.razerzone.com



If you like a linear narrative, look elsewhere: Max Payne 3 bounces all over the place, both time- and location-wise.

Max Payne 3

The even bigger fall of Max Payne

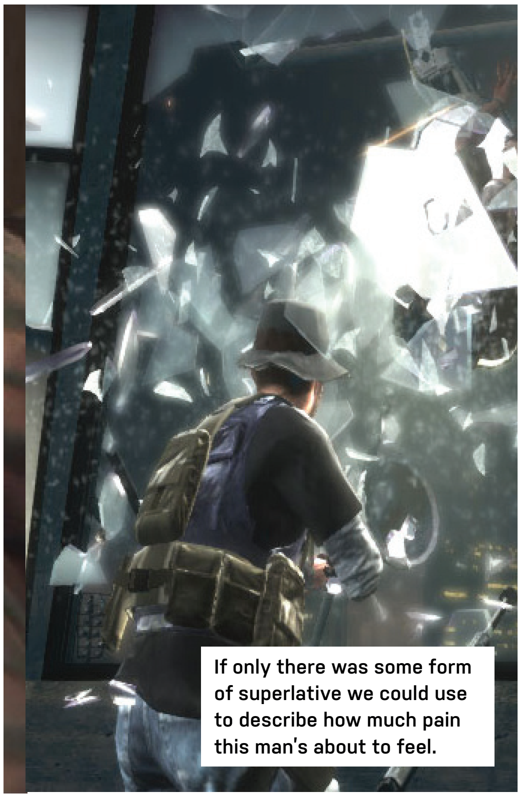
MAX PAYNE is a man who's insanely uncomfortable inside his own skin. He's still haunted by the death of his family, and in Max Payne 3, his body—more so than any random member of Brazil's criminal underbelly—is the target of his most vicious attacks. Booze. Pills. Booze. Pills. Booze. Pills. Perhaps the most self-destructive character gaming has ever seen, Max is a ticking time bomb of good intentions and life's harsh realities. And, for better or worse, so is this game. It claws desperately at greatness in so many places—a gripping cinematic narrative, real character development, a Rockstar-worthy world, utterly sublime shooting—but narrowly manages to fall short every time. In slow-mo.

For instance, let's take Max himself. This time around, the story centers on what he figured would be a simple job protecting a wealthy Brazilian businessman and his family. Of course, that goes out the window when a corrupt police force starts making Max's life hell. Well, more than it already was. "So this was it," he growls cynically after it's all gone horribly wrong. "My easy retirement money. My blood-stained 401K." On the upside, Max's noir narrations (noirrations?) are back in full force—still fairly campy, but also dragged through a slurry sludge by Max's nearly terminal case of self-loathing. And, you know, alcohol.

But the story—in spite of Rockstar's knack for fantastic acting and film-like cinematography—rarely meshes well with the game. Instead, it feels sadly beholden to the whims of Max Payne 3's real star: glorious slow-mo gunslinging. Max's narrations, then, are often wasted on bombastic variations of, "And then we walked through a door. And then we shot some guys." The best bits, meanwhile, dive into Max's stream of consciousness when the bullets stop flying. Unfortunately, this is a game about shooting people, so that doesn't happen terribly often.

And yet, somewhat oddly, Max Payne 3's shooting is equally anchored by the plot, dragging *it* down as well. Rockstar's focus on grim plausibility (at least, for a game) demands less over-the-top gunplay, so slow-mo shootdodging isn't typically your best option. Instead, we ended up spending most of our time taking advantage of a state-of-the-art cover system, huddled in fear of both bullet-sponge enemies and some nasty difficulty spikes brought on by a few truly terrible checkpoints. The checkpoint issue, especially, is a curse that's followed Rockstar since GTA III, leading to downright infuriating repeated replays of sections that last upwards of 20 minutes.

On top of that, there's this annoying schism between the demands of Max Payne 3's rapid-fire plot and the structure of a game. "Explore!" bellows Max Payne 3: The Videogame. "Collect golden gun pieces and look for largely useless and poorly implemented evidence! Don't worry about the goons gunning down your partner. That doesn't matter right now." But then, as though the directorial devil to the freeform angel on your shoulder,



If only there was some form of superlative we could use to describe how much pain this man's about to feel.

Who said Brazil can't look dark, moody, and noir-ish?

Max has seen much, much better days.

Max Payne: The Movie steps in. "Oops, your partner died due to your negligence and you have to start this section over again," it taunts. "Better luck next time." And even when lives aren't at stake, someone's always whispering in Max's ear. "What are you doing, Max? Hurry up! Go on! Jeez, you geezer. Did you die of old age back there?"

That said, when all the dominoes are lined up properly, shooting sections are utterly wonderful. The animation and physics systems, especially, verge on astounding, with every inch of enemies' bodies reacting to each specific bullet impact in gruesomely believable fashion. It simply *feels* amazing. And, of course, when our slow-mo dives didn't end with Max's mangled body clattering to the ground, it was like watching some kind of morbidly graceful bullet ballet. It all looks markedly better on a PC, too, with high-resolution textures popping while DirectX 11 hums along smoothly in the background.

Moreover, Rockstar quite obviously *did* take into account that players would probably get stuck on many sections, and—though better checkpoints would've been much preferred—its solutions are subtly ingenious when taken on their own terms. Foremost, there's adaptive difficulty. Dying once simply brought us back with full health, but biting the big one twice on the same part yielded full bullet time as well. Three times, meanwhile, handed us a nice big bottle of health-restoring painkillers for our troubles. Bad habits die hard, except when you die hard and it reinforces your bad habit, apparently.

For better or worse, multiplayer nearly matches single-player for sheer quantity of serious ups and downs. On one hand, it encourages far less cover-taking and allows for exciting pockets of bullet time based on line-of-sight, but the shell around it is pretty much exactly what you'd expect. It's an all-too-traditional rhythm: shoot guys, gain XP, level up, unlock a tediously standard set of weapons, etc. That rusty casing, however, surrounds a couple of modes that are incredibly well thought-out. Payne Killer, for instance, sees two players morph into Max and his partner, Raul Passos, with extra firepower and health items to match. The remaining six players—completely bereft of any extra abilities—then have to hunt them down. The end result is utterly frantic asymmetrical teamwork.

Gang Wars, meanwhile, is round-based and decides objectives based on the biggest bullet points from earlier battles. So basically, it weaves its own little narrative thread, resulting in, among other things, manhunts for the player with a previous round's highest killcount, defusing bombs set in your territory, and assassinating prized targets. Then the final round explodes into blissful deathmatch chaos where whichever team is down on points makes a desperate (and sometimes successful) attempt at turning the tides. So, the bottom line? There's big potential in Max Payne 3's multiplayer, but—between snooze-inducingly standard progression and a lack of interesting maps—the lasting appeal isn't there.

Taken as a package, then, Max Payne 3 dual-wields some truly formidable ideas, but never really hits home with any of them. Given room to breathe, its story could've been a tale for the ages. With a bit more fine-tuning, its action could've been some of the best in the business. And its multiplayer really *tried* to integrate with the game's world and setting, which is extremely admirable. As a result, Max Payne 3 is most certainly not by any means painful, but it hurts to know how incredible it could've been. **–NATHAN GRAYSON**

VERDICT 7

Max Payne 3

+ BOOZE Story's well-done when it's at its best; fantastic animations make shooting feel amazing; neat multiplayer ideas.

– PILLS Story often secondary to shooting; difficulty spikes, bad checkpoints, and constant cover often frustrate; multiplayer lacks real hooks.

$52, www.rockstargames.com, ESRB: M

LAB NOTES

GORDON MAH UNG **DEPUTY EDITOR**

Thunderbolt Arrives

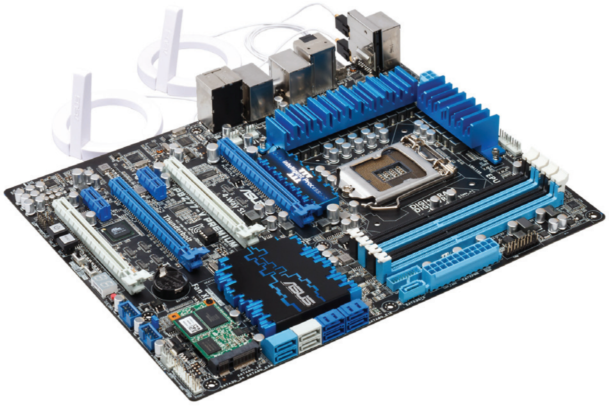
But not for X79

I HAD COME to believe that Intel's Thunderbolt I/O is the future. That is, until I realized that some things about it make no sense.

If you don't know about Thunderbolt, it's an amazingly forward-looking I/O interface that many think will be the basis of most external I/O, including USB 4.0.

As I write this, though, Thunderbolt is only available on Intel products with integrated graphics. I love Ivy Bridge but, frankly, I think a lot of people who need extremely high I/O performance—say, video editors, for example—are the kind of folks who need six-core, eight-core, and dual-processor machines. Since there's no integrated graphics in any LGA2011 parts right now, you can't run Thunderbolt.

Such a clear limitation of Thunderbolt makes me a little skeptical about where the technology is headed. Yes, it'll be great to have fast I/O on a notebook, but why exclude performance desktop and workstation users?

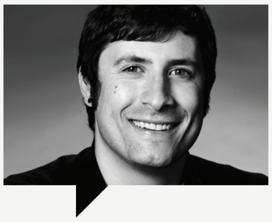


Alex Castle
Contributing Editor

I may have moved to the Aloha State, but it's not all sun and surf for me—I'm still spending plenty of time with tech. My most recent purchase is a Wacom Intuos5 tablet, which has been a ton of fun to use, and the responsiveness is especially refreshing after trying to draw on an iPad.

Katherine Stevenson
Editor-in-Chief

This issue's case roundup has me considering moving my PC into some new digs (I'm one of those who like the Corsair Vengeance C70—those latches!). My build is fairly recent, but I'm second-guessing my decision to use an NZXT Vulcan microATX case. I like that it takes up so little space, but, boy, is it a pain if I ever need to swap parts!



Nathan Edwards
Senior Editor

Between designing, configuring, and installing the Dream Machine watercooling setup and rehabilitating the 2008 Dream Machine, it's been a heck of a month. Still, an optimizer's work is never done. Up next: putting Jelly Bean on my Galaxy Nexus and trying to figure out how to play Day Z.

Richard Koscher
Art Director

Finally, the Issue we have all been waiting for: Dream Machine 2012. If you're wondering, the theme for DM is "retro-futuristic," and it was captured perfectly by the fantastic paint job from Smooth Creations. The paint they used is from a vintage Harley Davidson, of all things: 1957 Skyline Blue and 1957 Antique White. It couldn't look more gorgeous, if you ask me.

LETTERS

WE TACKLE TOUGH READER QUESTIONS ON...

> DIY Laptops
> FreeNAS Fan Speaks Out
> Irate about 'Upgrade'

I Want to Build My Own Laptop

I've built several of my own computers over the many years of reading *Maximum PC*, even a few with your step-by-step instructions, but I don't recall reading any articles about building your own laptop computer. Would building my own laptop be possible, practical, or more cost efficient than buying one from a dealer? And if so, are there any resources available for builders who want to take on this task?

—Bob Mahncke

DEPUTY EDITOR GORDON MAH UNG RESPONDS: Laptop DIY has actually been a small subculture for many years, and about five or six years ago *Maximum PC* itself did a story on such a "build." Notebook builds don't have the same flexibility as desktop builds. You're really ordering a notebook sans CPU, RAM, HDD, and ODD and adding the pieces as you see fit. You generally have no ability to swap panels, motherboards, or GPUs. Some vendors began pushing it as an option, and Intel even came up with its Common Building Block program to help foster more interchangeability of parts in notebooks, but ultimately it went nowhere. You can still build a notebook if you wish, though. Directron.com has long sold notebook "white books," or bare-bones, and just now, I'm seeing an MSI Core i5/i3 notebook build with discrete graphics for about $400. Bring your own CPU, RAM, HDD, and ODD, though.

Confused by Router Review

In your review of the Asus RT-N66U (July 2012), you compare it to Netgear's WNDR-4500. You stated that both have dual USB 2.0 ports, but I could swear the WNDR-4500 has USB 3.0. If Netgear does have USB 3.0, how does it still get lower benchmarks than Asus's USB 2.0 ports? This is important to me because I was considering getting the WNDR-4500 within the next few weeks, but then I saw your review of RT-N66U and now I'm suddenly conflicted about what to get. I already have a WD My Book with USB 3.0 for an external drive, and that is why the port issue matters to me.

—Les Abernathy

CONTRIBUTING WRITER MICHAEL BROWN RESPONDS: For whatever reason, Netgear used blue plastic to fabricate the WNDR-4500's two USB ports. Since this color is typically associated with USB 3.0, many people—myself included, I'm afraid—jumped to the conclusion that the WNDR-4500 had USB 3.0 ports. Whatever Netgear's intention was, the company informed me of my error as soon as the review was published online.

Give Us a FreeNAS Update

Howdy from Texas! Can you set up a new FreeNAS build article for a future issue? Not all of your subscribers worship at the MS altar.

—Peter G. Jacobs

SENIOR EDITOR NATHAN EDWARDS RESPONDS: Yes! Our last FreeNAS feature, in late 2009, used FreeNAS 7. FreeNAS 8 removed the streaming features that make a home NAS so appealing, so we've been waiting for FreeNAS 8.2, which adds support for plugins so we can restore UPnP, DLNA, and BitTorrent functionality. At press time, 8.2 is in beta, so it's getting close to a stable release. Look for an updated FreeNAS feature soon.

When Is an Upgrade Not an Upgrade?

I just read the article in your July issue, "Operation Upgrade." Initially, I found it interesting that you tried to upgrade a Core 2 Quad Q6600. I myself am still running a system very similar to this one and was curious as to what I could do with mine. However, reading the article and looking at the added parts, I realized this is not an upgrade. You replaced the motherboard, processor, RAM (due to going from DDR2 to DDR3), and videocard, along with a few other items. The only parts you salvaged were the case, optical drive, PSU, and perhaps the hard drive for data. Considering that at the end of your magazine, your Baseline build is roughly $200 more than the "upgrades" on this machine; you should have commented on that fact. This machine should have been donated to a poor college student, your parents, or used as a secondary computer or server. On the front of your magazine is the line "Minimum BS," but the two pages dedicated to this upgrade smell distinctly like BS. I am, and will continue to be, a loyal subscriber, but call this what it truly is, and don't try to claim it's an upgrade.

—Chris Wilson

DEPUTY EDITOR GORDON MAH UNG RESPONDS: It very much depends on what the meaning of "upgrade" is, Chris. Is an upgrade only replacing the CPU or adding RAM? Or is swapping the board fair game? Yes, the upgrade for the Dell was mostly a migration of the

↘ submit your questions to: comments@maximumpc.com

hardware from our Baseline configuration—minus the hard drive, optical, case, PSU, and GPU. Some of the savings we used toward a more modern GPU: the XFX Radeon HD R7870 card, which is faster than the GPU used in the Baseline and compatible with the PSU in the Dell XPS. To me, it makes more sense to keep a functional case, PSU, and other components in service and apply some of the savings from not having to buy those parts toward a higher-end GPU. This is especially true if you have any attachment to a case, or are the kind of person who doesn't like to send things to eWaste. Finally, the parts from the upgrade don't have to be thrown away. You can still find said poor college student running a Pentium D and give him or her the parts for free. One valid point we did omit from the story, which has been pointed out by readers, is that simply buying a newer Dell box with nearly the equivalent in hardware can be done. It is, frankly, extremely difficult to compete with OEMs who get great volume discounts on hardware and software that you and I don't get. Why didn't we go that route instead? I will admit that some of the motivation was to find out if we could actually upgrade the old Dell, because I didn't believe it was possible.

Sucking vs. Blowing

In reference to the "Upgrading Dos and Don'ts" in the July 2012 issue (page 32): In the part "Do Tidy up the Interior," you guys mentioned that you use a vacuum to suck the dirt (dust bunnies) from the inside of the PC. I have always been instructed (not to say I always do what I am told) not to use a vacuum because of the potential for static electricity to damage a component.

I have always used the classic strategy of compressed air in a can or an air compressor to blow the dust out of the inside of a PC. I perform this task annually!

—**Colin Bryant**

SENIOR EDITOR NATHAN EDWARDS RESPONDS: We've never had it happen, but it's not impossible that a vacuum could build up static electricity and discharge onto your components. Your strategy of using compressed air is a safer bet—just make sure you don't damage your fans! Hold the blades gently in place while you clean them.

PCIe 2.0 vs. 3.0, x8 vs. x16

Regarding Nathan Edwards's Build It article, "Building (Ivy) Bridges in the Sky" (July), the motherboard chosen is praised for having two x16 PCIe 3.0 slots. While it's true that there are two slots with the physical x16 form factor, if both slots are used, the interface drops back to x8 for each slot. I know that you guys have on several occasions dismissed the notion that there is any noticeable loss of performance between two x16 interfaces and two x8 interfaces with current peripherals, but can you remind me why this is? And is it the improvement between PCIe 2.0 and 3.0 that accounts for your vilification of the earlier chipset (for the 1156 socket, I think) that limited PCIe channels versus your acceptance of the Z77 chipset?

—**Bruce Watson**

SENIOR EDITOR NATHAN EDWARDS RESPONDS: PCIe 3.0 has a maximum theoretical transfer speed per lane of 1GB/s in each direction, compared to 500MB/s for PCIe 2.0, so an x8 PCIe 3.0 connection should have the same max theoretical transfer rate (16GB/s) as an x16 PCIe 2.0 connection, while an x16 PCIe 3.0 connection will have double that.

TechPowerUp recently tested a GTX 680 and a Radeon HD 7970 on PCIe 1.1, 2.0, and 3.0 at x4, x8, and x16 (bit.ly/LxNQE3). It found that each card performed exactly the same at PCIe 2.0 x16 as at PCIe 3.0 x8. PCIe 2.0 x8 was about 4 percent slower, while PCIe 3.0 x16 was about 1 percent faster than PCIe 2.0 x16 or PCIe 3.0 x8.

So GPUs in two PCIe 3.0 slots at x8 should perform just as well as in two PCIe 2.0 slots at x16, and a little faster than in two PCIe 2.0 slots at x8. So, yes, we'd rather have two PCIe 3.0 slots at x8 than 2.0 slots at the same speed, but even at 2.0 the differences are minimal.

[NOW ONLINE]

THE PC GAMES TO LOOK FOR OVER THE NEXT YEAR

There's no better time to evaluate the next year's crop of PC games than after the annual influx of new trailers from E3. Console gaming still gets most of the news coverage, but there are tons of very promising PC games, as long as you know where to look. Let us spare you the trouble of searching with our compilation of the most promising PC game trailers at bit.ly/KxPKKB.

[NEXT MONTH]

COMING IN MAXIMUM PC's

NEARLY ASBESTOS-FREE OCTOBER ISSUE

Cheapskates Rejoice!
Just because you like to pinch a penny doesn't mean you can't be a power user. We'll show you a bunch of ways to save money without sacrificing performance.

All-in-One Roundup
We're busy gathering up representatives from the latest crop of All-in-One PCs. Find out how they differ and which one you should be rocking.

Hybrid Graphics How-To
Learn how you can use LucidLogix Virtu to smartly divide your graphics workload between your discrete card and the integrated graphics in your CPU.

Sponsored by newegg.com
TAKE IT FROM A GEEK.℠

THE BUILDS

BASELINE

INGREDIENTS

PART		URL
Case	Fractal Design Define R3 with USB 3.0	www.fractal-design.com
PSU	Corsair TX750 V2	www.corsair.com
Mobo	Asus P8Z77-V	www.asus.com
CPU	Intel Core i5-3570K @3.4GHz	www.intel.com
Cooler	Cooler Master Hyper 212 Evo	www.coolermaster.com
GPU	EVGA GeForce 560 Ti 448	www.evga.com
RAM	8GB Patriot Gamer DDR3/1600	www.patriotmemory.com
Optical Drive	Samsung SH-222BB	www.samsung.com
Solid-State Drive	OCZ Agility 3 120GB	www.ocztechnology.com
Hard Drive	Seagate Barracuda 3TB	www.seagate.com
OS	Windows 7 Home Premium 64-bit	www.microsoft.com

Approximate Price: $1,315

PERFORMANCE

INGREDIENTS

PART		URL
Case	NZXT Phantom 410	www.nzxt.com
PSU	Corsair HX850	www.corsair.com
Mobo	Asus Sabertooth X79	www.asus.com
CPU	Intel i7-3820 @4.7GHz (overclocked)	www.intel.com
Cooler	NZXT Havik 120	wwww.nzxt.com
GPU	Asus GTX 670 DirectCU II TOP	www.asus.com
RAM	16GB Corsair Vengeance DDR3/1600	www.corsair.com
Optical Drive	LG WH12LS39 BD-R burner	www.lg.com
Solid-State Drive	OCZ Agility 3 120GB	www.ocztechnology.com
Hard Drive	Seagate Barracuda 3TB	www.seagate.com
OS	Windows 7 Professional 64-bit	www.microsoft.com

Approximate Price: $1,840

WE'VE HAD some readers ask why our Baseline rig costs more than $1,300. Maybe baseline is the wrong word—this is a no-BS, sweet-spot gaming machine that's forward-compatible and powerful without being overkill. We can, and do, build sub-$1,000 (and sub-$700) gaming rigs, but they require compromise due to budget constraints. The Baseline doesn't.

Nothing much has changed since we updated to Ivy Bridge last month, other than some price drops that save about $30 over the same configuration last month. We considered swapping the GeForce 560 Ti 448 for a Radeon HD 7850, but the 560 Ti still wins most of our benchmarks despite its slightly higher price.

OUR BASELINE is everything you need for high-resolution, high-quality gaming. Full stop. But if you add an extra $500 to your budget, you get more stuff: eight processor threads instead of four, eight RAM slots, and an upgrade path to a six-core CPU down the line. You also get a Blu-ray burner and one of the fastest GPUs we've ever tested. This Sandy Bridge-E rig has remained mostly the same since it debuted in June, except for the videocard—and the price. We're now recommending Asus's GTX 670 DirectCU II TOP (August 2012), which outperforms a stock GTX 680 in all of our benchmarks, while being $70 cheaper.

ULTRA

OUR ULTRA configuration is for the *Maximum PC* reader who needs ultra-fast encoding and rendering, tip-top graphical prowess, and speedy storage. It's a step above what's necessary for 95 percent of the population, but it can't touch this month's beautiful and powerful Dream Machine, which we get weak-kneed just thinking about.

The price of our Ultra configuration is now under $3,400. Instead of two Radeon HD 7970s, we're recommending a GTX 690. If you're going to have two $500 GPUs in one machine, you might as well put them on the same card and save some room and some power.

Intel's Core i7-3930K is $600 worth of six-core madness, and the Corsair H100 cooler makes it easy to push the CPU to 4.8GHz from its 3.6GHz stock speed.

Cooler Master's Cosmos II case is huge and luxurious, with plenty of airflow to cool everything, and the Asus motherboard is great for overclocking and will hold another GTX 690 if you go absolutely out of your gourd for power. We're keeping the 256GB Samsung 830 SSD and 6TB of speedy mass storage.

For our complete Best of the Best list of recommended components, visit www.maximumpc.com/best-of-the-best.

INGREDIENTS

PART		URL
Case	Cooler Master Cosmos II	www.coolermaster.com
PSU	Thermaltake Toughpower Grand 1050W	www.thermaltakeusa.com
Mobo	Asus P9X79 Deluxe	www.asus.com
CPU	Intel i7-3930K @4.8GHz (overclocked)	www.intel.com
Cooler	Corsair H100	www.corsair.com
GPU	EVGA GTX 690	www.evga.com
RAM	16GB Corsair Vengeance DDR3/1600	www.corsair.com
Optical Drive	LG WH12LS39 BD-R burner	www.lg.com
Solid-State Drive	Samsung 830 Series 256GB	www.samsung.com
Hard Drive	Seagate Barracuda 3TB (x2)	www.seagate.com
OS	Windows 7 Professional 64-bit	www.microsoft.com

Approximate Price: $3,390

SUGGESTED PAIRINGS

Kick-ass peripherals for your new rig

MIDRANGE MONITOR
Asus PA238Q
$300, www.asus.com

KEYBOARD
Razer BlackWidow Ultimate
$130, www.razerzone.com

MOUSE
Cyborg R.A.T. 9
$100, www.cyborggaming.com

GAMING HEADSET
Corsair Vengeance 1500
$100, www.corsair.com

SPEAKERS
Corsair SP2500
$205, www.corsair.com

MAXIMUM PC (ISSN 1522-4279) is published 13 times a year, monthly plus Holiday issue following December issue by Future US, Inc., 4000 Shoreline Court, Suite 400, South San Francisco, CA 94080. Phone: (650) 872-1642. Fax: (650) 872-2207. Website: www.futureus.com. Periodicals postage paid in San Bruno, CA and at additional mailing offices. Newsstand distribution is handled by Time Warner Retail. Basic subscription rates: one year (12 issues) US: $14.95; Canada: US$19.95; Foreign: US$29.95. Canadian and foreign orders must be prepaid. Canadian price includes postage and GST (GST #R128220688). PMA #40612608. Subscriptions do not include newsstand specials. POSTMASTER: Send changes of address to Maximum PC, PO Box 5852, Harlan, IA 51593-1352. Standard Mail enclosure in the following editions: None. Ride-Along enclosure in the following editions: None. Returns: Pitney Bowes, PO Box 25542, London, ON N6C 6B2, Canada. Future US, Inc. also publishes @Gamer, Crochet Today!, Mac|Life, Nintendo Power, The Official Xbox Magazine, PlayStation: The Official Magazine, PC Gamer, and Windows: The Official Magazine. Entire contents copyright 2012, Future US, Inc. All rights reserved. Reproduction in whole or in part is prohibited. Future US, Inc. is not affiliated with the companies or products covered in Maximum PC. Reproduction on the Internet of the articles and pictures in this magazine is illegal without the prior written consent of Maximum PC. Products named in the pages of Maximum PC are trademarks of their respective companies. PRODUCED IN THE UNITED STATES OF AMERICA.